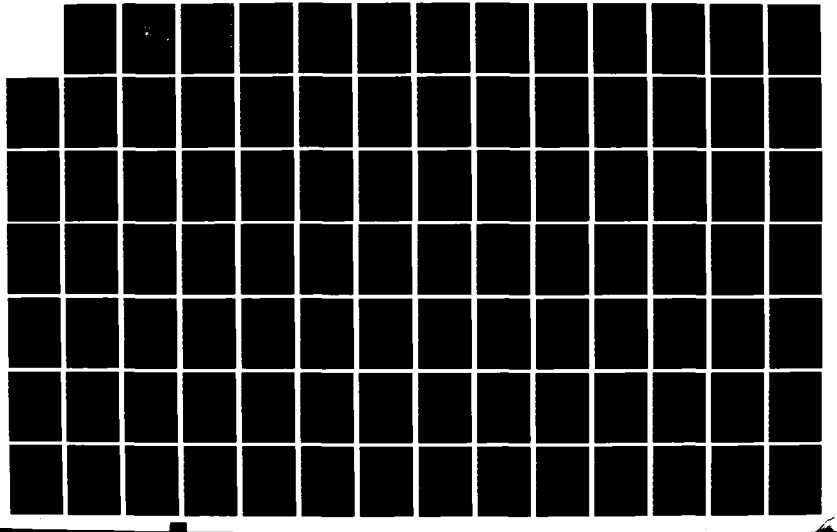
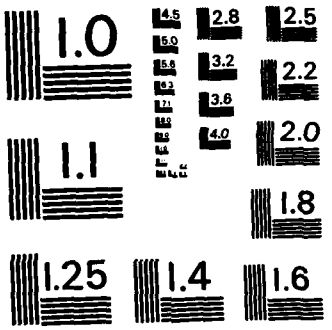
AD-A159 589 SELECTION OF ORGANIZATION STRUCTURES WITHIN THE NAVAL FACILITIES ENGINEERING COMMAND(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA C F VAUGHAN JUN 85 1/2

UNCLASSIFIED F/G 5/1 NL

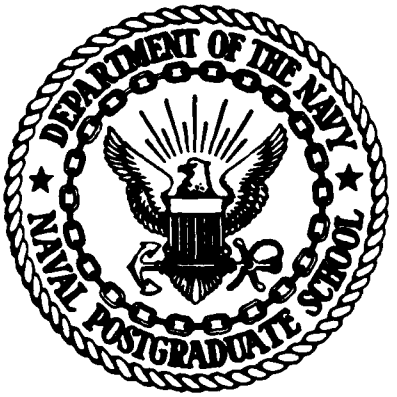




MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

(2)

NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

SELECTION OF ORGANIZATION STRUCTURES
WITHIN THE
NAVAL FACILITIES ENGINEERING COMMAND

by

Charles Francis Vaughan

June 1985

Thesis Advisor: W. R. Talutis

Approved for public release; distribution is unlimited.

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A159 589	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Selection of Organization Structures Within the Naval Facilities Engineering Command		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis June 1985
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Charles Francis Vaughan		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93943-5100		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93943-5100		12. REPORT DATE June 1985
		13. NUMBER OF PAGES 111
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release, distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Naval Facilities Engineering Command, Multiattribute Utility Measurement, Organization Structure, Engineering Field Division, EFD, NAVFAC, ROICC

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This thesis proposes a method of selecting organization structures for the Naval Facilities Engineering Command. Multiattribute utility measurement, a quantitative methodology, is used to select the best structure from among five possible organization structures. To determine the best structure organization attributes are identified and weighted. Each alternative is given a utility value for each attribute, which

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

S/N 0102-LF-014-6601

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20.(cont'd.)

when summed provides a quantitative evaluation of the alternative organization structures.

Approved for public release; distribution is unlimited.

Selection of Organization Structures Within the Naval Facilities Engineering Command

by

Charles F. Vaughan
Lieutenant, Civil Engineer Corps, United States Navy
B.S., University of Kansas, 1977

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1985

Author: Charles F. Vaughan
Charles F. Vaughan

Approved by: W. R. Talutis
W. R. Talutis, Thesis Advisor

R. G. Driever
R. G. Driever, Second Reader

W. R. Greer
W. R. Greer, Chairman,
Department of Administrative Sciences

Kneale T. Marshall
Kneale T. Marshall,
Dean of Information and Policy Sciences

ABSTRACT

This thesis proposes a method of selecting organization structures for the Naval Facilities Engineering Command. Multiattribute utility measurement, a quantitative methodology, is used to select the best structure from among five possible organization structures. To determine the best structure organization attributes are identified and weighted. Each alternative is given a utility value for each attribute, which when summed provides a quantitative evaluation of the alternative organization structures.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

maintenance of facilities and operation of utilities; to direct and administer the operation and maintenance of family housing; to administer the assignment, replacement and disposal of transportation, construction, fire-fighting and weight handling equipment and to provide technical advice and assistance in the maintenance and utilization thereof; to assist activities in the application of the programs assigned to the Naval Facilities Engineering Command for technical or management direction; to provide facilities engineering assistance to those naval commands for which the Naval Facilities Engineering Command Field Division has been designated as the principal staff advisor; and to perform such other functions as may be directed by the Commander, Naval Facilities Engineering Command." [Ref. 9: Encl (1)]

2. The Organizat n of the Engineering Field Divisions

a. The former Engineering Field Division Organization

Prior to the spring of 1985, the Engineering Field Divisions were to be organized as shown in Figure 4.2, as specified by NAVFAC instruction 5450.73C [Ref. 9: Encl (2)].

To support their missions Engineering Field Divisions were organized into three major departments (excluding the Comptroller Department), similar to the Headquarters organization. As was done at the Headquarters level, the first departmentation was by product or service. The Acquisition Department of the EFD was responsible for the acquisition of new facilities. The planning for that facility was accomplished by the Facilities Planning and Real Estate Department and technical advice concerning the maintenance of facilities was provided by the Facilities Management Department.

As was done at the Headquarters level each major department was functionally organized into divisions. The divisions were then subdivided by product or services, just as was done at the Headquarters level. (See Appendix F for a discussion of product and functional departmentation).

3. The Organization of NAVFAC

NAVFAC's organization chart, as of 1 January 1985, is shcwn in Figure 4.1.

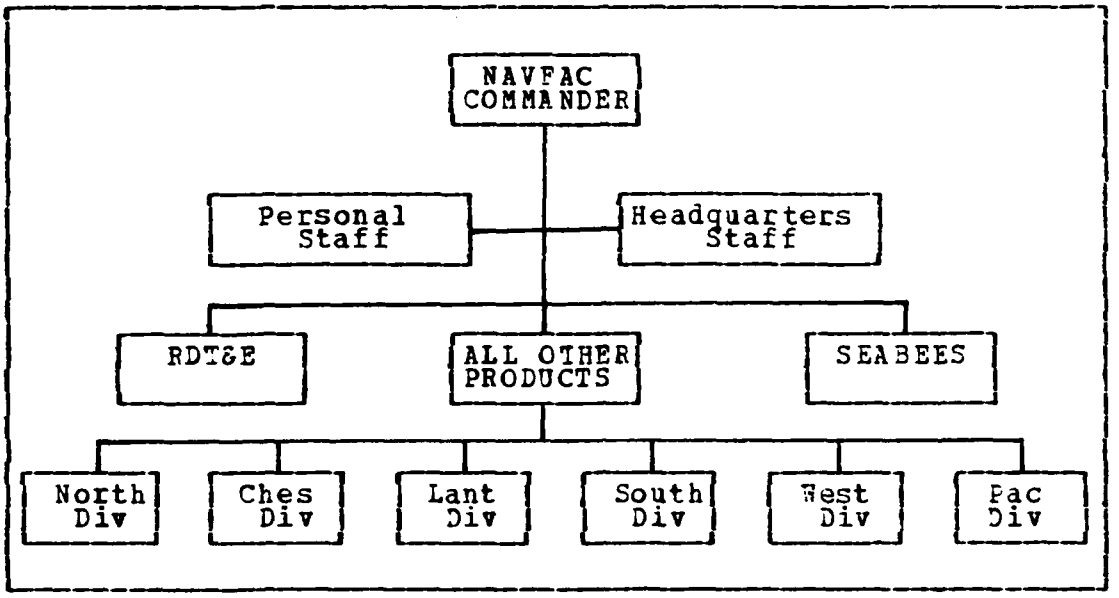


Figure 4.1 The Naval Facilities Engineering Command.

B. THE ROLE AND ORGANIZATION OF THE ENGINEERING FIELD DIVISIONS

1. The Role of the Engineering Field Divisions

Engineering Field Divisions (EFDs) are decentralized elements of NAVFAC, responsible for technical support and construction of Naval facilities within their geographical areas.

The mission statement for the EFDs is as follows:

> "To accomplish the planning, design and construction of public works, public utilities, and special facilities for the Navy and other Federal agencies and offices; tc acquire and dispcse of real estate for the Navy; to provide technical advice and assistance on the

"It is the policy of NAVFAC and the Chief of Civil Engineers that the most efficient means will be sought in the conduct of Command business and strictest economy, consistent with effective support, will be exercised at all Command levels." [Ref. 15: p. A-33]

The Command Management Plan also contains objectives for the Naval Facilities Engineering Command. The objectives for fiscal year 1984 were:

1. "To ensure that the shore facilities and fixed ocean facilities necessary to support the Navy are available at the best balance between requirements and economy.
2. To support the provision of a well-trained and equipped Naval Construction Force (including reserve components) at the highest level of readiness consistent with anticipated requirements.
3. To extend Civil Engineer Corps and Facilities Engineering Command services into all areas in which Navy requirements can best be supported by a military engineering organization.
4. To achieve an aggressive program of development and adoption of advancements in technology and management which will improve the effectiveness of Civil Engineering Services.
5. To provide all services with the highest quality of professional performance and with a sense of responsibility to the user.
6. To maintain a high level of readiness and capability to expand to meet enlarged peacetime, emergency, or wartime requirements.
7. To foster a favorable environment for personal development and professional growth that will attract outstanding personnel, and stimulate, and appropriately reward all personnel." [Ref. 15: p. B-2]

Another statement of policy that might influence the design of organization structure is that:

"Functions will be decentralized to the maximum extent consistent with economy and efficiency." [Ref. 15: p. A-41]

The NAVFAC organization should be efficient, decentralized, and provide responsive service, in a professional manner, to its customers and clients.

6. Providing technical and managerial assistance to the operating forces; and
7. Providing other technical and managerial assistance.

NAVFAC's mission responsibility is promulgated in NAVMAT instruction 5460.2A [Ref. 14]. The Command Management Plan, issued by the Commander, NAVFAC, lists a multitude of duties and responsibilities for the Naval Facilities Engineering Command. Four of these are:

1. Providing architectural and engineering design and construction of Navy shore facilities and fixed surface and sub-surface ocean structures;
2. Providing technical and managerial advice and assistance regarding in-house or contract performance of maintenance of grounds, buildings and structures (Class I and II property) and related services;
3. Programming, planning, design, construction, acquisition and disposal of family housing; and
4. Inspecting and approving design and construction of items, provided at Government expense, at privately operated establishments that would constitute public works or public utilities if constructed at a naval shore activity. [Ref. 15: pp. A-9 - A-10]

To provide this support, such as the construction of a new facility, personnel with many different skills are employed by NAVFAC. NAVFAC has chosen to departmentalize these skills by functional area to "capitalize on the advantages of grouping skills." [Ref. 15: p. A-20]

2. Command Objectives

The Command Management Plan contains policy statements of the Naval Facilities Engineering Command. The following policy statement is of interest to the design of organization structure.

IV. THE NAVAL FACILITIES ENGINEERING COMMAND

A. THE ROLE AND ORGANIZATION OF NAVFAC

1. The Role of NAVFAC

The Naval Facilities Engineering Command exists to administer the Navy's shore facilities program. The Naval Facilities Engineering Command is a service organization; its mission is to provide facilities services to its customers. It exists to provide support in the form of shore facilities and related engineering material and equipment to, primarily, the operating forces of the Navy and Marine Corps.

The Role of NAVFAC is summed up in NAVFAC's Contracting Manual, the P-68, as follows: The Naval Facilities Engineering Command is responsible and authorized to perform the design, planning, development, procurement, construction, alteration, repair and maintenance at all shore activities of the Naval Establishment for public works and public utilities. [Ref. 13: p. 1.3.1]

The Naval Facilities Engineering Command produces seven basic products or services for its customers. These include:

1. Conducting Research, Development, Test and Evaluation;
2. Acquiring real estate;
3. Building new facilities;
4. Maintaining facilities (through Public Works Centers);
5. Providing mobile construction resources through t SEABEES;

Multiattribute utility theory includes the following steps:

1. Identify the relevant attributes.
2. Rank the attributes in order of importance.
3. Rate the attributes in importance, by assigning the least important attibute a rating of 10.
4. Normalize the weights given to the attributes.
5. For each attribute, rate the alternatives.
6. Calculate the utility of each alternative.
7. Select the alternative with the greatest overall utility value. [Ref. 12: pp. 14-17]

By applying multiattribute utility measurement to organization structures a measure of the "goodness" of each structure can be computed. The structure with the maximum utility value provides the best "goodness" of fit with the attributes.

This methodology will be utilized to select, from several alternatives, the most appropriate organization structure for the EFDs, ROICC offices, and NAVFAC.

III. MULTIATTRIBUTE UTILITY THEORY BACKGROUND

The methodology for selecting an appropriate organization structure is based on multiattribute utility theory. From an economics viewpoint utility is a number that represents the level of satisfaction that a consumer derives from a particular market basket [Ref. 10: p. 51]. Utility, as applied to organizatien structures, is a measure of how good a particular structure fulfills an attribute. By adding up the utility of all the attributes an organization desires to maximize, a single measure of "goodness" can be developed. That single value can then serve as a basis upon which to compare the appropriateness of one structure over another.

Multiattribute utility theory has been applied to other decisions involving the maximization of several attributes. For instance, multiattribute utility theory was utilized by Giauque to measure the quality of medical care. The problem, as defined by Giauque, was that the quality of medical care was defined by multiple effectiveness criteria, which first had to be defined. [Ref. 11: p. 1] After these criteria (attributes) were defined it was then possible to measure the quality of medical care by evaluating each attribute.

Multiattribute utility theory was also utilized by Gardiner and Edwards to carry out the requirements of California's Coastal Zone Conservation Act. The act required the decision makers to preserve, protect, restore and enhance the environment and ecology of California's coastal zone. To evaluate the various attributes cited by the act, Gardiner and Edwards suggested using multiattribute utility theory. [Ref. 12: pp. 1-37]

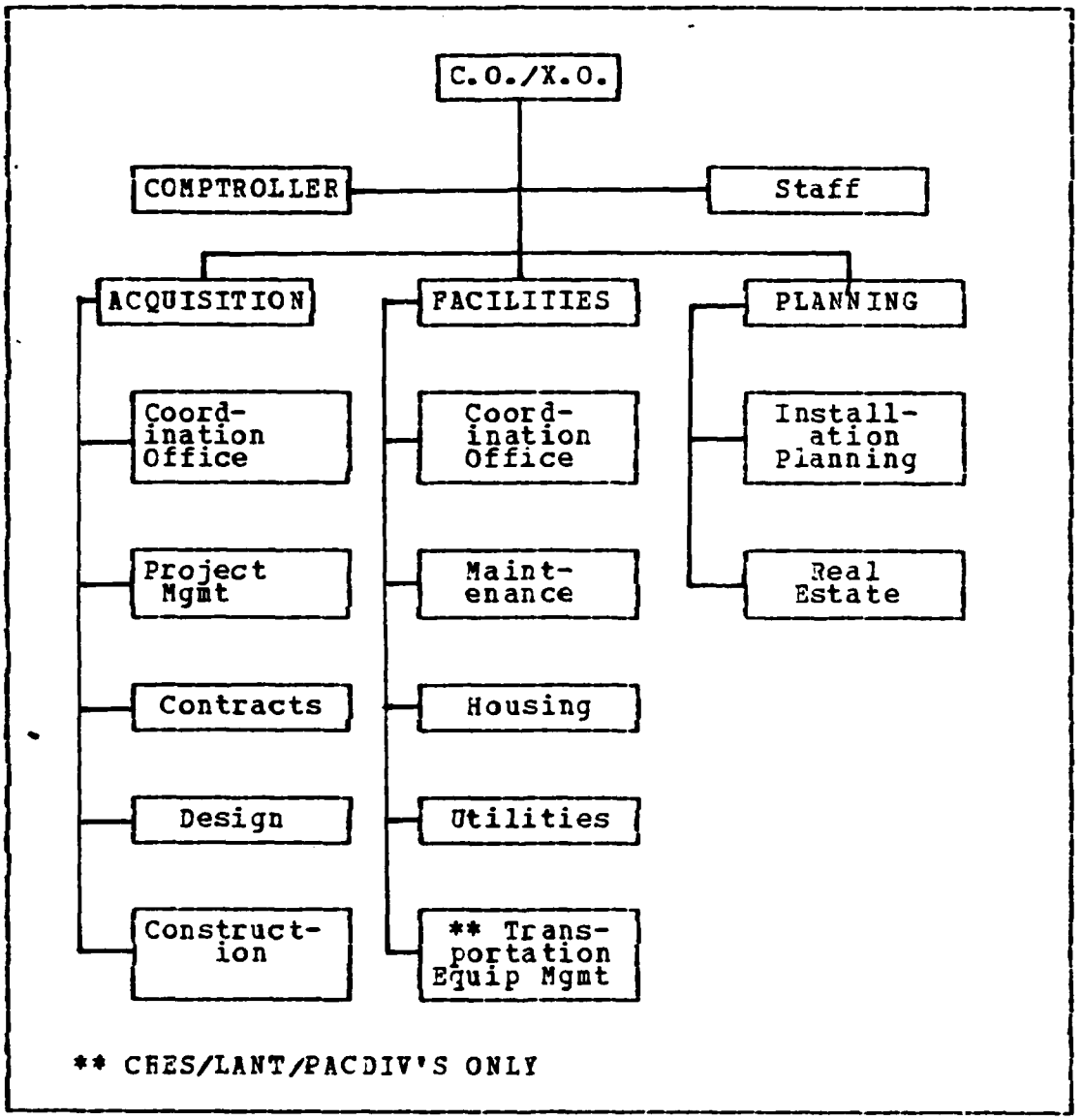


Figure 2.1 Pre 1985 EFD Standard Organization.

The report contained thirty-two recommendations specifically aimed at improving those three areas. Recommendation number twenty-one recommended that

> "...NAVFAC create a contracts department (independent of the 09A chain) at each EFD answerable directly to the EFD commander." [Ref. 8: p. 7]

The PMR found that within the pre 1985 EFD organization (see Figure 2.1, [Ref. 9)] business decisions were being dominated by the engineering community (design, construction, and the acquisition department head). The head of the contracts division was being relied upon to ensure that the decisions being made complied with the regulations and that the documentation was proper and complete. The PMR noted that because of the organization structure the head of contracts was not in a position to independently evaluate the business aspects of a decision or raise his concern to a high enough level within the EFD (because the contracts division head was not working directly for the commanding officer of the activity).

The PMR noted that Public Law 98-191 of 1 December 1983 discusses the organization of operational procurement. The law states that to effectively carry out its responsibilities, the procurement function must be placed at a sufficiently high level in the organization to ensure "...direct access to the head of the major organizational element...served" and "...comparative equality with organizational counterparts" [Ref. 8: p. 36]. (The complete text of public law 98-121 that applies to the organization structure is contained in Appendix A).

II. PROCUREMENT MANAGEMENT REVIEW BACKGROUND

After examining the March 1984 NAVFAC report "Organization and Staffing of NAVFAC Contracting Offices", the May 1984 Naval Material Command (NAVMAT) report, "Procurement Management Review of the Naval Facilities Engineering Command (draft)", and the August 1984 GAO report, "The Navy needs to Strengthen Facilities Construction and Maintenance Contracting Practices and Management Controls (draft)", the Quinn Ad Hoc Study Report recommended changing the EFD organization. The Ad Hoc Study committee, composed of senior Command representatives, was tasked to review the basic Command organization with regard to its adequacy in meeting NAVFAC's rapidly changing and increasing procurement mission. The Ad Hoc Study Group presented to the Commander, NAVFAC, one recommended and two alternative structures for consideration as the new standard EFD organization structure. [Ref. 6]

The primary focus of the NAVMAT Procurement Management Review (PMR) was the effectiveness of NAVFAC in carrying out its business management and contracting responsibilities at both the Headquarters and EFD levels [Ref. 8: p. 1]. An examination of the PMR of NAVFAC will reveal why changes to the organization structure were proposed.

The three major findings of the NAVMAT PMR were that:

1. NAVFAC lacks a sufficiently skilled and trained procurement workforce;
2. the contracts divisions at the EFDs are at too low an organizational level; and
3. the NAVFAC contracts organizations should place increased emphasis on management and oversight responsibility. [Ref. 8: p. 3]

A second approach is to first identify several typical and basic organizational forms. The criteria of the organization is then applied to these several forms in order to identify the structure that most closely fits the needs of the firm. The final step of the approach is to further refine the selected form with particular emphasis on economic and human resources feasibility. [Ref. 5: p. 716]

This thesis will develop a methodology of selecting an organization structure modeled after the second approach of Ansoff and Brandenburg. The proposed methodology uses multiattribute utility measurement, (a method of determining, from a limited number of alternatives, which alternative is the most appropriate), to identify the structure that most closely fits the needs of the EFD. It is an analytical method of determining the worth of alternatives containing several attributes. Though it is not normally utilized to select alternative organization structures, multiattribute utility measurement is useful because it quantifies the decision process.

Without some method of quantifying the decision process the decision maker must somehow make a mental trade off analysis between the various attributes and alternatives in order to come to a decision [Ref. 7: p. 87]. The use of multiattribute utility measurement is one method of quantifying the selection decision and should prove useful to decision makers.

This thesis will address a portion of organization design, the division of labor and the interunit coordination of that division. Given several possible divisions of labor, a methodology of selecting, from several alternatives, the best division of labor (structure) will be developed. However, even after a structure is selected the goals, structure, and rewards should be continuously monitored for their fit with each other, as time and conditions change. [Ref. 3: p. 7]

In the spring of 1985 the Naval Facilities Engineering Command (NAVFAC) formed an ad hoc committee (referred hereafter as the Quinn Ad Hoc Study Group) to examine problems identified by a 1984 NAVFAC report "Organization and Staffing of NAVFAC Contracting Offices", a 1984 Naval Material Command report "Procurement Management Review of the Naval Facilities Engineering Command (draft)", and a 1984 draft General Accounting Office report "The Navy needs to Strengthen Facilities Construction and Maintenance Contracting Practices and Management Controls". The Quinn Ad Hoc Study Group recommended a change to the Engineering Field Division (EFD) structure as a solution to the problems and recommendations of those reports. The Quinn Ad Hoc Study Group report contained three new possible organizational structures for the EFDs which they presented to the Commander, NAVFAC. [Ref. 6]

There are numerous ways to select an optimum organization structure. Anscff and Brandenburg suggest that there are two ways to approach organization design. One way to proceed is through synthesis. After identifying criteria and dimensions for the organization, the criteria are used to select and combine the dimensions into a desired organizational structure. The criteria and dimensions are used to design the "ideal" organization structure from the ground up.

I. INTRODUCTION

The process of selecting the most appropriate structure for an organization can be a critical decision for an activity. For instance, Drucker notes that the wrong organizational structure could seriously impair business performance and may even destroy it [Ref. 1: p. 194]. The selection of an organization structure is not, therefore, a decision to be made lightly; it could have an affect on the organization for years to come.

The structure of an organization is defined as the pattern of interactions and coordination that link the technology, tasks, and human components of an organization together. Organizations should be designed to fit with the environment and provide the information and coordination needed. [Ref. 2: p. 60]

The subject of organization design has been addressed by several authors, among them Duncan, Galbraith, Robey and Ansoff and Brandenburg [Ref. 2, 3, 4, and 5]. Organization design, a much broader concept, is defined by Galbraith as the search for coherence or a fit. It is a decision process which seeks to encourage coherence between a) the goals and purposes for which the organization exists, b) the division of labor and the interunit coordination, and c) the personnel of the activity. There are numerous choices of the goals and purposes for the organization; for example, what division of labor to use, how the subtasks will be coordinated, what personnel will be selected, and how those personnel will be rewarded. Organization design seeks not only coherence of those choices but to maintain that coherence over time. [Ref. 3: p. 5]

ACKNOWLEDGEMENTS

The following individuals deserve special acknowledgement for their assistance in producing this thesis. Captain Robert E. Quinn, Jr., CEC, USN, provided a copy of the Quinn Ad Hoc Study Group report and took time from his busy schedule to discuss that report in detail. LCDR W. R. Talutis, CEC, USN, spent countless hours reading and discussing this document and providing guidance in its development.

I am especially grateful for the support provided by my family, Kris, Kelsey and Ryan, while completing this project.

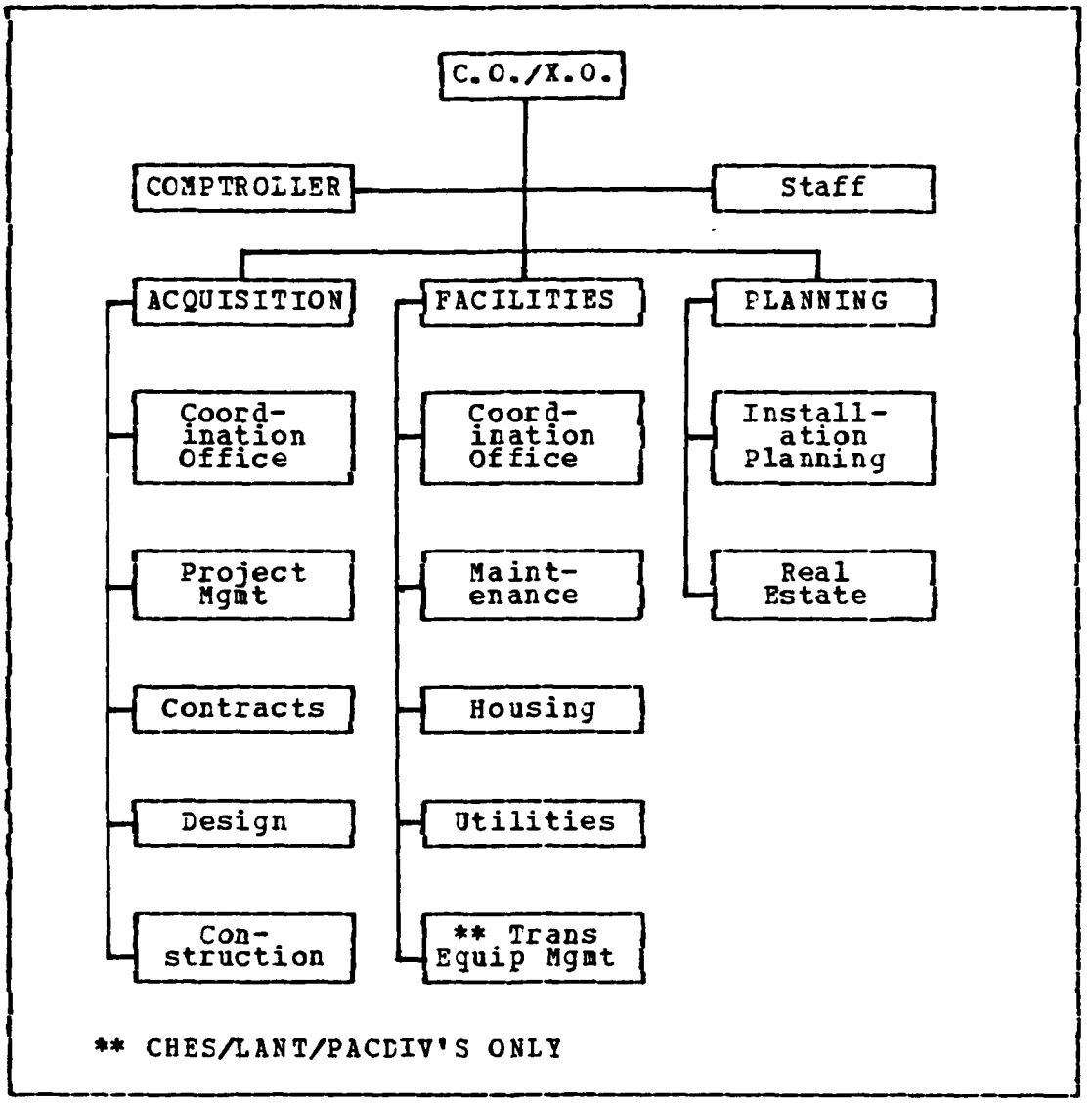


Figure 4.2 Pre 1985 EFD Standard Organization.

b. The current Engineering Field Division Organization

The current EFD organization structure, selected from the three alternatives of the Quinn Ad Hoc Study Group, is shown in Figure 4.3.

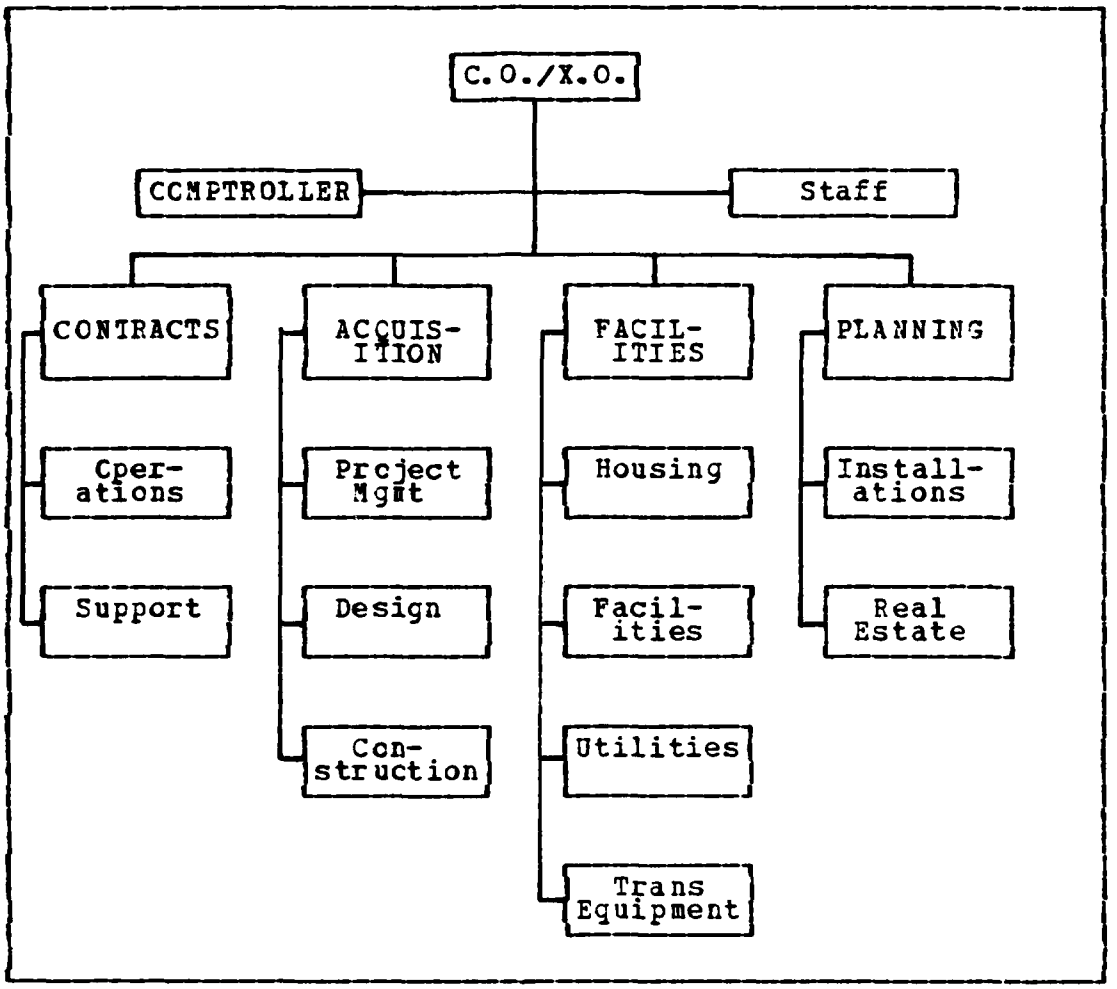


Figure 4.3 Post 1985 EFD Standard Organization.

The new organization of the Engineering Field Divisons incorporates both a product and functionally organized structure. In addition to the three major departments that existed in the previous structure a fourth department has been created, the Contracts Department. The newly created Contracts Department consists of two divisions, contracts operations and contracts support. The creation of a Contracts Department is viewed by this author as an effort to correct a finding (NAVFAC procurement professionals do

not play a strong enough role in acquisition matters) of the Quinn Ad Hoc Study Group [Ref. 6].

V. STATEMENT OF THE PROBLEM

The Procurement Management Review, conducted by the Naval Material Command in 1984, identified several problems of the organizational structure of the Naval Facilities Engineering Command. They noted that:

> "In order to carry out their business and contracting responsibilities, procurement personnel should be at a high enough organizational level to ensure direct access to the commanding officer, establish comparative equality with their organizational counterparts, and enjoy sufficient status to deal with contractor executives. Within the EFDs the contracts divisions are currently subordinate to the acquisition departments and do not have direct access to the commanding officers. This organizational structure hampers the capability of the contracts divisions to independently evaluate the business aspects of programmatic decisions, or to raise business concerns to a high enough level of authority within the EFD." [Ref. 8: p. 2]

The study, in surveying the EFDs, also found that

> "Technical personnel with inadequate procurement training are performing business functions which are routinely handled by procurement personnel in the systems commands. Among the EFDs reviewed there was a universal perception that the role of the contracts divisions was to provide administrative (i.e., clerical) and technical (i.e., procurement regulations) support. Responsibility for overall contract and business management concerns, including acquisition planning, selection of contract type, and innovative planning, is dispersed to other codes considered by NAVFAC senior managers to be better able to provide management and leadership in the business arena. For example, Code 10 (Facilities and Transportation) has assumed the lead in the service contracting arena developing innovative contracting and contract administration approaches. Code 05 (Construction) typically plays the dominant role in field office reviews and in the management of change orders." [Ref. 8: p. 18]

The review team felt that even though construction could be considered a specialized commodity, it was not enough of a unique commodity to prevent NAVFAC from establishing a

procurement organizational relationship similar to that found in most other Navy activities, such as NAVSEA and ADPSC [Ref. 8: p. 37].

The PMR team therefore recommended that:

1. NAVFAC create a contracts department (independent of the Acquistion Department) at each EFD answerable directly to the EFD commander; and
2. that all contracts personnel within the EFDs and their subordinate activities report both technically and for evaluation purposes through the contracts chain of command. [Ref. 8: p. 7]

Implementation of the PMR recommendation could, however, affect some of the other attributes, such as decentralization, that NAVFAC wishes to maximize. It is too early to tell to what extent these other attributes will be affected, because the change in structure is a very recent change (spring 1985).

There is more than one way to organize the subtasks of the EFDs, as suggested by the fact that the Quinn Ad Hoc committee proposed three possible structures. Given that there are multiple organization structures available, what should the tradeoff be among the various attributes of the EFD in selecting the most appropriate organization structure?

The problem, then, is how does one select the most appropriate organization structure for the EFDs?

VI. METHODOLOGY

A. INTRODUCTION

There are various ways to select the most appropriate organization structure. For instance, Duncan advocates using a decision tree to guide the designer to the right organization structure [Ref. 2: p. 72]. Ansoff and Brandenburg developed a process for organizational design they considered useful in selecting the most appropriate organization structure. Ansoff and Brandenburg identified several steps by which the designer of the organization structure is able to systematically refine the structure [Ref. 5: p. 729]. Execution of the Ansoff and Brandenburg method, however, requires complex data gathering and analysis.

A goal of the author was to develop a methodology that would produce quantitative results. Multiattribute utility measurement uses quantitative analysis to evaluate a multitude of alternatives over a range of attributes. A search of the literature revealed that multiattribute utility measurement had been applied to many situations and it might be possible to apply it to selecting a best organization structure from among several alternatives. The methodology selected by this author consists of the following steps:

1. Group tasks into organizational structures;
2. Evaluate these structures and select, from among them, the most appropriate structure using multiattribute utility measurement; and
3. Analyze the selected structure for its fit and ease of implementation.

B. STEP ONE - GROUP TASKS INTO ORGANIZATIONAL STRUCTURES

Organizational structure is nothing more than the grouping of an organization's tasks in such a manner that the grouping is advantageous to the activity. There are numerous ways to group activities; the most common are by function, by product, or by geographical area. (Data on these basic organizational structures is contained in Appendix B).

There are several good references that deal with the division of tasks and the regrouping of these tasks into an organization structure. The reader may wish to consult Drucker, Galbraith, or Robey for additional information on this subject [Ref. 1, 3, and 4].

With respect to NAVFAC, the question is not so much one of how to subdivide these tasks but rather how they should be put back together. The divisions and branches that exist within the EFDs are tasked with performing specific subtasks. The first step will be to brainstorm possible combinations of these branches and divisions (subtasks). The emphasis is not on the grouping of subtasks into optimum organizations, but rather to group the tasks into as many different structures as possible. Selecting the best grouping of subtasks will be determined in step two.

C. STEP TWO - EVALUATE THE ORGANIZATIONAL STRUCTURES

A form of multiattribute utility measurement will be used to evaluate and select the most appropriate organization structure. Multiattribute utility measurement is a process of identifying the attributes an alternative should possess, weighting these attributes, evaluating each alternative against these attributes, and then scoring each alternative. The alternatives, in this case, are alternative organization structures.

The steps of this process are a. follc :

1. Identify the relevant attributes. This decision is subject to the judgement of each evaluator. Because too many attributes makes the weighting of those attributes difficult, nc more than fifteen attributes is recommended. At the other extreme, too few attributes could result in an organization structure that is not well rounded to meeting all the relevant missions. Edwards recommends that the number of attributes be kept to a modest level by restating and ccmbining goals, or by moving upward in a goal hierarchy. He also recommends simply omitting the less important goals as opposed to having too many attributes. His rule of thumb is that eight attributes is plenty and fifteen attributes is too many. [Ref. 17: p. 328]
2. Rank the attributes in order of importance. For example, if decentralization is most important, that attribute should be ranked first.
3. Rate the attributes in importance, by assigning the least important attibute a rating of 10. Next consider the next least important attribute and rate its importance in comparison with the least important attribute. Continue this process until all the attributes have been rated. The same rating may be given to more than one attribute if two attributes cannot be distinguished in importance from one another.
4. Normalize the weights given to the attributes. This is done by summing the weights and dividing each weight by the sum of the weights.
5. For each attribute, rate the alternatives. There are numerous ways to do this; the method that will be utilized is to assign a value of 10 to the

alternative that provides the greatest amount (utility) of an attribute. The other alternatives are then rated by comparing them to the alternative assigned a value of 10. If they provide the same amount of utility they are rated a 10; if they provide less utility they are assigned a value less than 10, but that value is a subjective decision. The utility value assigned should be indicative of the strength of that alternative as compared to the alternative which provides the maximum utility.

6. Calculate the utility of each alternative. Multiply the values of each attribute (step 5) by the weight of that attribute (step 4) and sum up those values.
7. Select the alternative with the greatest overall score. [Ref. 16: pp. 38-46] In the computations that follow a utility value and a standard deviation of that value will be computed. Adding and subtracting one standard deviation of the sample from the mean will provide a range of utility values (containing 68.26 percent of normal outcomes if a normal distribution is assumed) which is preferable (to the author) over a single point value. Computing the standard deviation provides a more realistic estimate of the population's true mean, that is, what the utility value would be if the methodology were repeated by all available personnel. [Ref. 18: p. 92]

The number of attributes, the weights of the attributes, and the utility values assigned all affect the utility values calculated. It is unlikely that another individual's computations, rating the organization structures, would be identical to the author's point estimates of the utility values. There is a better chance that the utility values calculated by a second, third, fourth, etc., individual

would approximate the author's by falling within one standard deviation of the point value calculated.

The use of multiattribute utility measurement to select an appropriate organization structure will be demonstrated in the following three chapters. First, however, a discussion of possible attributes is necessary.

The attributes selected should reflect the organization's strategy. Corporate strategy is defined as the pattern of decisions in a company that (1) determines, shapes, and reveals its objectives, purposes, or goals; (2) produces the principal policies and plans for achieving those goals; and (3) defines the business the company intends to be in, the kind of economic and human organization it intends to be, and the nature of the economic and noneconomic contribution it intends to make to its shareholders, employees, customers, and community. [Ref. 19: p. 93] NAVFAC's strategy can be found in its policy and objectives listed in Section A.2 of Chapter 4. Those policy and objective statements were condensed into the following criteria:

1. Provide effective support through efficient operations in the most economical fashion (policy);
2. Promote decentralized operations (policy); and
3. Promote professional performance (objective #5);

There are other possible attributes which could be utilized to determine the best organization structure. These include, but are not limited to,

1. the level of conflict resolution;
2. the efficiency of the workflow;
3. the efficient use of resources;
4. the ability to cope with a changing and multifacitated environment;
5. the ability to cope with task uncertainty;

6. the independence of the contract administration function;
7. equalizing the role of contracts personnel and technical personnel;
8. the level of innovation; and
9. the level of goal congruence.

One must be cautioned that some of the attributes, listed above, can be influenced by other factors external to the organization structure. For example, the Command Management Plan lists innovation as an objective of NAVFAC. Although the organization structure can have an affect on innovation, innovation is also affected by management's philosophy, the type of personnel employed, and the level of decentralization within the organization.

In the author's opinion innovation and the level of goal congruence, while important, are affected more by factors external to the organization structure. Therefore the attributes that will be considered in the methodology that follows are:

1. the level of conflict resolution;
2. the efficiency of the workflow;
3. the efficient use of resources;
4. the ability to cope with a changing and multifacitated environment;
5. the ability to cope with task uncertainty;
6. the independence of the contract administration function;
7. direct access of contracts personnel to the commanding officer;
8. the equalizing of contracts personnel and technical personnel;
9. the level of decentralization; and
10. promoting the professionalism of personnel.

These attributes are explained in the paragraphs that follow.

1. The Attributes

a. The Level of Conflict Resolution

The level at which conflicts are resolved and activities are integrated can contribute to the success of an organization. For instance, taking routine decisions to a higher level supervisor is likely to extend the decision process. On the other hand, if those decisions can be made by a department or division head those decisions will probably be made much faster. The level of conflict resolution also depends on how the subtasks are grouped. If subtasks are grouped so that each department is able to complete its tasks without outside assistance, there will probably be fewer conflicts with other departments that need resolution. Any conflict within the department could be resolved by the department head.

b. The Efficiency of the Workflow

Efficiency can be influenced by the workflow, that is, the synchronization of the workflow can affect efficiency. If the workflow is not coordinated or monitored, tasks may either fail to be performed or fail to be performed in a timely manner. Also as more tasks pass from one department to another there is increased opportunity for misinterpretation of the task or a delay in performing the task.

c. The Efficiency of Resource Use

Efficiency is the ratio of inputs to outputs, that is, how well the activity uses its inputs to produce its outputs [Ref. 20: p. 196]. The question here is how

well the structure promotes the efficient use of limited human resources. For instance, when IBM moved from a functional organization to a product organization structure in 1957, the executive payroll increased by some two million dollars per year. This increase was caused by the demolition of the central corporate staff and the duplication of its former activities in each new product division. [Ref. 21: p. 112] Clearly the functional organization incurred less cost to provide the same output or service; therefore for IBM the functional organization was a more efficient organization than the product organization. NAVFAC's organization structure should encourage the meeting of objectives through the best use of available human resources.

d. The Ability to Cope with a Dynamic, Multifacitated Environment

The environment of an organization, or more specifically the task environment, includes customers, suppliers, regulatory agencies, competitors, labor markets, the scientific-technical community, and other relevant units. The number of different environments, referred to as the complexity of the environment, and the rate of change of the environment, referred to as the uncertainty of the environment, both affect the type of organization structure. Different organization structures have been found to be better suited to particular combinations of complexity and uncertainty in the environment. Robey suggests that for an organization to be effective it should be matched to its environment as shown in Table 1. [Ref. 4: p. 122]

e. The Ability to Cope with Task Uncertainty

The desire for an organization to cope with task uncertainty can be an important attribute. Task uncertainty

TABLE 1

Environment and Organization Design

	DEGREE OF COMPLEXITY: Simple	DEGREE OF COMPLEXITY: Complex
Little change in the environment	Low perceived uncertainty. Organization structure is simple, with few functional divisions and standardized rules. Example: soft-drink company	Moderately low perceived uncertainty. Organization has variety of functional divisions, each of which is controlled with standardized rules. Example: food producer
Extensive change in the environment	Moderately high perceived uncertainty. Organization is decentralized, with separate boundary units and few standardized rules. Example: Commercial airline	High perceived uncertainty. Organization has numerous separate decentralized divisions which cannot be controlled with standardized rules. Example: Telephone company

is defined as the degree to which information necessary for task performance is variable or unpredictable. Fobey suggests that there are certain organization structures that are more appropriate than others for combinations of size and task uncertainty in the environment. For instance a small company facing a very uncertain task should decentralize and use minimum differentiation or control. Table 2 shows a recommended organization structure given the size of the activity and the task uncertainty it faces. [**Ref. 4: p. 128**]

and other assistance as appropriate, depending upon the local environment.

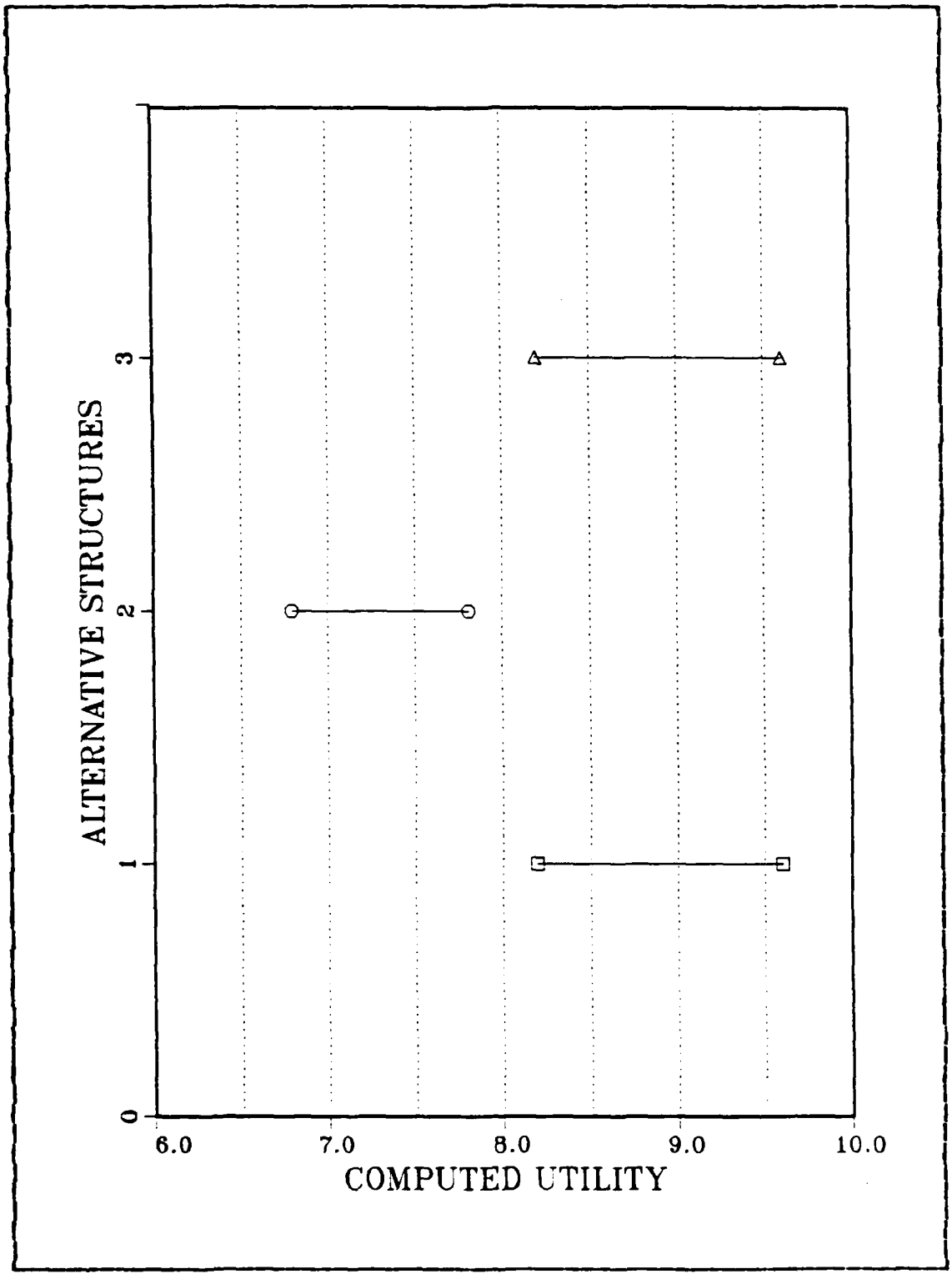


Figure 7.4 Utility of NAVFAC Alternative Structures.

single point estimate of utility value. This range accounts for the fact that not all personnel evaluating these three alternatives would evaluate the structures in exactly the same manner, but rather that almost 70 percent of the time they would reach the same conclusions.

The conclusion reached by the author is that either alternative #1 or #3 is an appropriate organizational structure for NAVFAC. Of course the attributes selected, the weights assigned, and the utility values given to the three alternatives all affect the computed utility values.

D. CHECKING FOR APPROPRIATENESS

It is probably no coincidence that Figures 7.1 and 7.3, computed to be the most appropriate organizations for NAVFAC, are the current organizational structure of NAVFAC or a slight modification of the current structure. Figure 7.2, while it is possible, is not conducive to providing face-to-face communication with the individual activities scattered worldwide. Although the structures of Figures 7.1 and 7.3 do not resemble that of NAVAIR (Appendix C), they do resemble that of NAVSUP (Appendix D).

Of the three Navy Systems Commands, NAVAIR, NAVSEA, and NAVSUP, the mission of NAVSUP is most like that of NAVFAC. Like NAVFAC its customers are scattered worldwide. Like NAVFAC its customers have unique requirements that often do not make centralized operations possible. (It also supports other customers of standardized requirements through a different organizational structure, utilizing a centralized procurement organization, the inventory control points). The strategy that the structure promotes is to standardize RDT&E and SEABEE Operations, and to allow the activity to manage its real estate, new facilities, facility assistance

TABLE 5

Rating of NAVFAC Alternative Structures

ATTRIBUTE	WGT	ALT #1 (1)	ALT #1 (2)	ALT #2 (1)	ALT #2 (2)	ALT #3 (1)	ALT #3 (2)
Decentralization	.2000	10	2.000	2	0.400	10	2.000
Conflict resolution	.1670	10	1.670	5	0.835	10	1.670
Equal personnel	.1670	10	1.670	10	1.670	10	1.670
Direct access	.1330	10	1.330	10	1.330	10	1.330
Workflow	.1000	10	1.000	10	1.000	10	1.000
Resources	.1000	4	0.400	10	1.000	4	0.400
Professionalism	.0670	5	0.335	10	0.670	5	0.335
Task uncertainty	.0330	5	0.165	10	0.330	5	0.330
Environment	.0330	10	0.330	2	0.066	10	0.033
TOTALS	1.0000		8.900		7.301		8.900
STANDARD DEVIATION			0.703		0.507		0.703

(1) Utility values
(2) Weighted utility values

6. Calculate the utility of each alternative. This is done by multiplying the utility value of each attribute (step 5) by the weight of that attribute (step 4) and summing up the values. The results of the author's calculations are listed in Table 5.
7. Select the alternative with the greatest overall score. Figure 7.4 shows graphically the computed utility values plus and minus one standard deviation. By including standard deviation a range of possible utility values is compared, rather than comparing a

Being the least important attribute it was assigned a rating of 10. Following this the remaining attributes were rated, as shown in Table 4.

TABLE 4

Rating of NAVFAC Attributes

RANK	ATTRIBUTE	RATING	NORMALIZED
1	Decentralization	60	.200
2	Conflict resolution	50	.167
3	Equalization	50	.167
4	Direct access	40	.133
5	Workflow efficiency	30	.100
6	Resources efficiency	30	.100
7	Professionalism	20	.067
8	Task uncertainty	10	.033
9	Environment	10	.033
	TOTAL	300	1.000

4. Normalize the weights given to the attributes. This is done by summing the weights and dividing each by the sum of the weights. Table 4 shows the results of normalizing the ratings.
5. For each attribute, rate the alternatives. For each attribute, the structure that best promotes that attribute is assigned a value of 10. The other structures are then rated relative to the structure that provides the maximum utility. For instance, the organization structure of alternative # 2 would make more efficient use of limited resources than the other two structures, because resources would not be duplicated at each of the EFDs. Alternative #2 is therefore given a rating of 10. The other two alternatives are given a rating of 4 to indicate that they are considered to be only about 40% as efficient in the use of limited resources.

d) The ability to cope with a changing and multifacitated envircnment;
e) The ability to cope with task uncertainty;
f) Direct access of contracts personnel to the commanding officer;
g) The equalizing of contracts personnel and technical perscnnel;
h) The level of decentralization; and
i) Promoting the professionalism of personnel.

2. Rank the attributes in order of importance. Table 3 shows the author's ranking of the attributes of the NAVFAC organization. It should be noted that this selection is a judgemental decision of the author and that different individuals might rank the attributes differently.

TABLE 3

Ranking of NAVFAC Attributes

RANK	ATTRIBUTE
1	Decentralization
2	Conflict resolution level
3	Equalization of personnel
4	Direct access to the commanding officer
5	Efficient workflow
6	Efficient use of resources
7	Professionalism of personnel
8	Task uncertainty
9	Environment

3. Rate the attributes in importance, by assigning the least important attibute a rating of 10. In the opinion of the author the activity's fit with the environment is not as important as any of the other attributes (because NAVFAC does not operate in a ccmpetitive business environment, where fit with the environment is crucial to survival and growth).

which structure, of the three, is most appropriate given NAVFAC's mission. Figure 7.1 is NAVFAC's current organizational structure; the Engineering Field Divisions provide the majority of services on a geographical basis. The only function that is truly centralized is the Research, Development, Test and Evaluation (RDT&E). Figure 7.2 depicts the NAVFAC organization as a strict product oriented activity. Separate activities would administer each product; for example, one activity would administer all real estate actions of NAVFAC. Another activity would be tasked with administering all new acquisitions. There are advantages to this form of organization; centralized operations would promote the sharing of lessons learned and each individual activity would probably become very proficient at its mission. The major disadvantage to this form of structure is the geographical separation between the user and the activity serving that user. Figure 7.3 is a variation of Figure 7.1, but in this case the Commanding Officers of the Public Works Centers report directly to the Commander, NAVFAC, rather than through the EFD Commanders.

C. SELECTING THE MOST APPROPRIATE STRUCTURE

The methodology of Chapter 6 described seven steps to follow to select the most appropriate organizational structure. These steps are:

1. Identify the relevant attributes. In the author's judgement nine of the ten attributes of Chapter 6 are relevant to the NAVFAC structure. These attributes are:
   a) The level of conflict resolution;
   b) The efficiency of the workflow;
   c) The efficient use of resources;

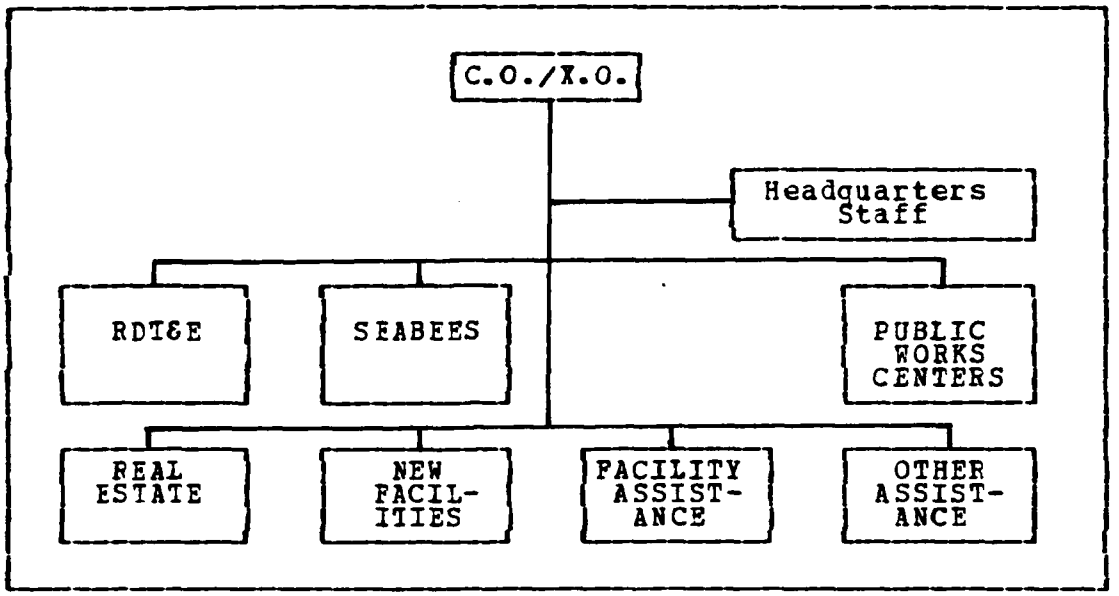


Figure 7.2 NAVFAC Organization, Alternative #2.

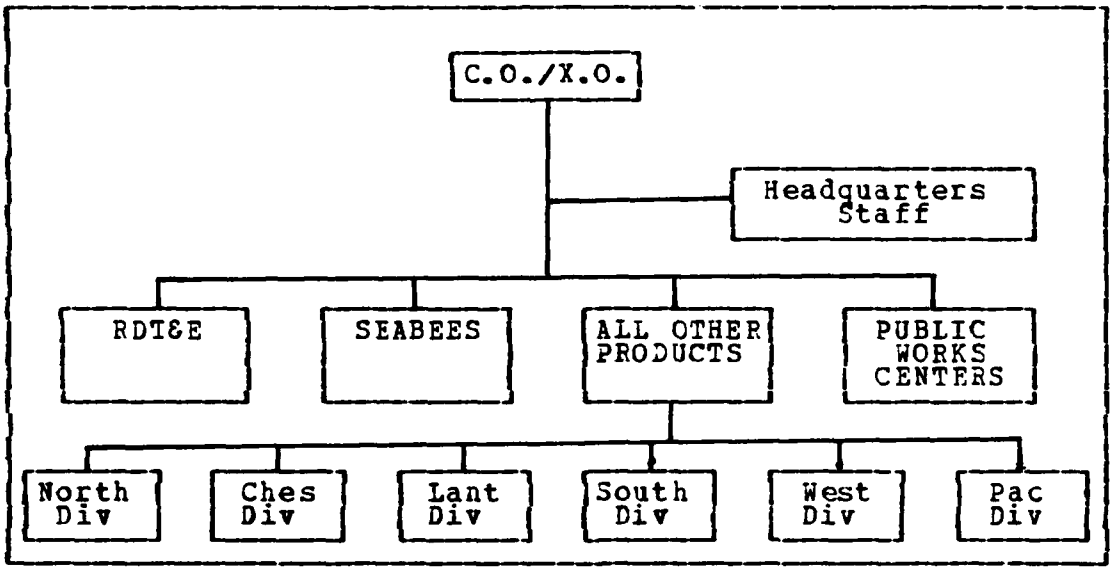


Figure 7.3 NAVFAC Organization, Alternative #3.

organized, as shown in Figures 7.1, 7.2, and 7.3. It is these three structures that will be analyzed to determine

VII. THE NAVFAC FIRST ECHELON STRUCTURE

A. INTRODUCTION

The organizational structure of the first echelon of NAVFAC will determine the mission of the Engineering Field Divisions. For instance, two possible structures are shown in Figures 7.1 and 7.2; although both are product organizations the strategy they support and the environment they are most suited for are very different.

B. THE ORGANIZATIONAL STRUCTURES

Three possible organizational structures for the first echelon of NAVFAC are shown in Figures 7.1, 7.2, and 7.3.

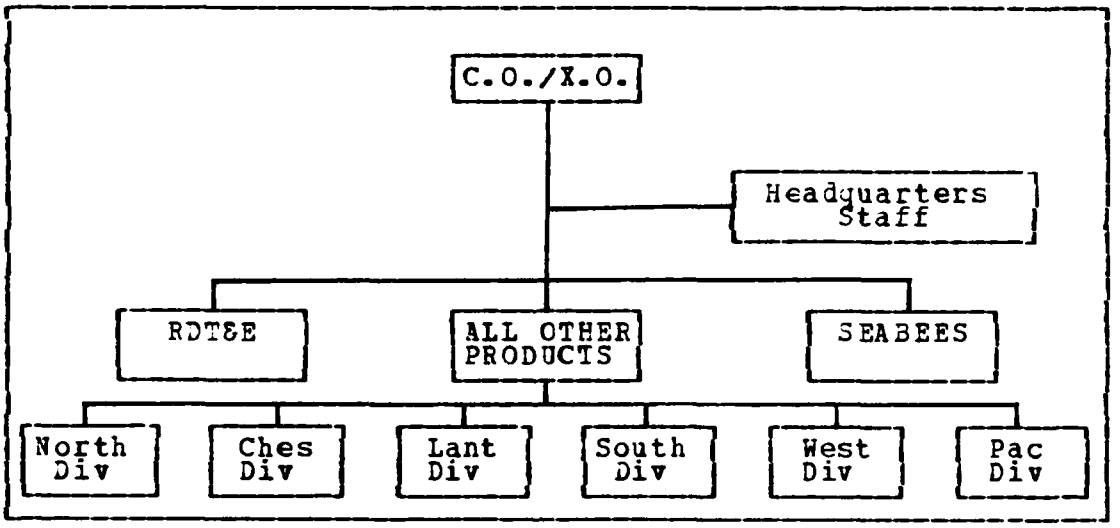


Figure 7.1 NAVFAC Organization, Alternative #1.

NAVFAC presently utilizes a product organization, where the products or services are organized as shown in Figure 7.1. There are different ways that the products could be

implementation. For instance, it might be compared to organizational structures that are used by similar activities, to see if the structure "makes sense". It should be analyzed to determine how the structure can be implemented, what changes are required, and how easy it will be tc make those changes. One might also look at what kind of strategy the organization promotes. If that strategy is not consistent with the current strategy, perhaps the structure is not appropriate.

3. The more functions that are affected by decisions made at the lower levels; and
4. The less checking required on the decision. [Ref. 24: pg. 421]

Maximum decentralization is one of NAVFAC's objectives. Although both a product and a functional organization can be decentralized, the product organization may promote greater decentralization because a greater amount of authority can be delegated (authority for a complete project, rather than just a segment of the project).

j. Highest Quality of Professionalism

Objective five of the Command Management Plan is to promote professional performance. Adam Smith in his studies concluded that operating specialization was the first and most powerful cause of England's position as the richest country in the world. He made controlled observations of two companies making straight pins; one was organized by function, the other by product. The functional organization, utilizing specialists, was able to produce 48,000 pins per day. The other organization, where each individual produced a complete pin, produced 200 pins per day. The functional organization was seen to be much more efficient at producing pins because the personnel were better at doing their particular tasks or jobs. [Ref. 21: pp. 112-113] To promote the development of personnel who are proficient at doing their particular tasks or jobs, in other words, professionalism, the functional type organization is preferred.

D. STEP THREE - ANALYZE FOR FIT AND EASE OF IMPLEMENTATING

Once an organization structure is chosen it should be analyzed for its applicability to the activity and ease of

> placing the procurement function at a sufficiently high level in the agency to provide direct access to the head of the major organizational element served and comparative equality with organizational counterparts." [Ref. 23: p. H3438]

Direct access can be either through a staff officer (as is done at the Headquarters of NAVFAC) or by elevating contracts personnel to the role of a separate department. How or to what extent this is done is a matter of personal preference.

h. Equalizing the Role of the Contracts and Technical Personnel

The PMR recommended that procurement personnel have comparative status with their organizational counterparts (see Public Law 98-191). In NAVFAC these counterparts are primarily technical personnel of the design and construction divisions. The professional status of contracts personnel might be raised by placing procurement personnel at a level equal to that of their counterparts.

i. Decentralized Operations

Decentralization is an indication of how much authority has been dispersed throughout an organization. To the extent that authority is not delegated, it is centralized. Some decentralization exists in all organizations, as long as subordinate managers and a structured organization exist. Centralization and decentralization are tendencies; they are qualities like "hot" and "cold". The degree of decentralization is greater:

1. The greater the number of decisions made at lower levels in the management hierarchy;
2. The greater the importance of the decisions made at those lower levels;

system, types of facilities to be built, construction processes and the finished product." [Ref. 22: pp. 2001-14]

The reporting chain of command of the ROICC does not allow some of the ROICC personnel to perform their functions as they should. The ROICC's chain of command for contract administration leads through the construction division of the acquisition department. The placement of the ROICC function results in the ROICC function being dominated by engineers. This domination is not only over the ROICC's technical personnel, but also over the contracts personnel.

The domination of the Construction Division was noted in an internal report which cited instances of the Construction Division hiring another engineer if a ceiling point was made available to the ROICC office. This practice contributes to the contract specialist/procurement clerk function being more understaffed than the rest of the ROICC office.

Increasing the independence of the ROICC office might 1) serve as a method of raising the status of contracts personnel and 2) provide a testing ground for future managers (as advocated by Drucker, [Ref. 1: p. 204]), and 3) raise the staffing level of contracts specialists and procurement clerks.

g. Access of the Contracts Personnel to the Commanding Officer

Increasing the access of the contracts personnel to the commanding officer is one of the recommendations of the PMR. It is probably based on the PMR team's interpretation of public law 98-191, as listed in Appendix A. Public Law 98-191 requires the head of each executive agency to

"establish clear lines of authority, accountability, and responsibility for procurement decisionmaking, including

TABLE 2

Size and Task Uncertainty and Organization Design

	TASK: Certain	TASK: Uncertain
Large organization	Bureaucratic, heavy emphasis cn rules, standard procedures and automation of administration. Example: Large bank	Differentiated structure with departmental structures appropriate to subtasks, elaborate superstructure for coordination and control. Example: State university system
Small organization	Strong centralized personal ccntrol, few standard procedures or documentation. Example: Family bakery	Organic, decentralized with little formal differentiation or control. Example: Small innovative electronic firm

f. The Independence of the Contract Administration Function

The on site administration of construction contracts is the function of the field contracting offices and the Resident Officer In Charge of Construction (ROICC). The ROICC function, as described by the Construction Contracting manual cf the Civil Engineer Corps Officer School includes:

> "...construction site reconnaissance and acquainting prospective bidders with conditions at the construction site. Definition and negotiation of changes including letters of direction, scope and government estimates. Inspection of construction to insure compliance with plans and specifications. Preparation and review of inspection reports and sampling and testing during construction. Review and negotiation of claims. Evaluating contractors' Quality Control (inspection)

VIII. THE EFD ORGANIZATION

A. INTRODUCTION

The EFD organization should support the four products the EFD is responsible for: real estate, new facilities, facility assistance, and other assistance. This chapter will examine five organizational structures, including the former EFD standard organization, and determine which of the five structures is most appropriate to accomplishing the mission of the EFD.

An assumption that the author has made is that the current NAVFAC structure, with geographical EFDs, is the most appropriate structure. This assumption should be kept in mind when reviewing the alternative structures evaluated.

There are no comparable organizations in the other Navy Systems Commands against which to evaluate the EFD organization. In both the NAVAIR and NAVSEA organizations separate activities exist to procure new systems (done at the Headquarters command) and to provide assistance and support (done at activities such as the Naval Air Propulsion Center). NAVFAC utilizes the EFD to provide both of those functions, that is, to procure new systems (the Acquisition Department) and to provide assistance and support (the Facilities Management and Planning Departments).

B. THE ORGANIZATIONAL STRUCTURES

The five organizational structures, chosen by the author, are shown in Figures 8.1 through 8.5. Three of the structures are the result of the Quinn study [Ref. 6: enclosures], (Figure 8.1, 8.2, and 8.4), one is the former (pre 1985) organization structure (Figure 8.5), and the remaining

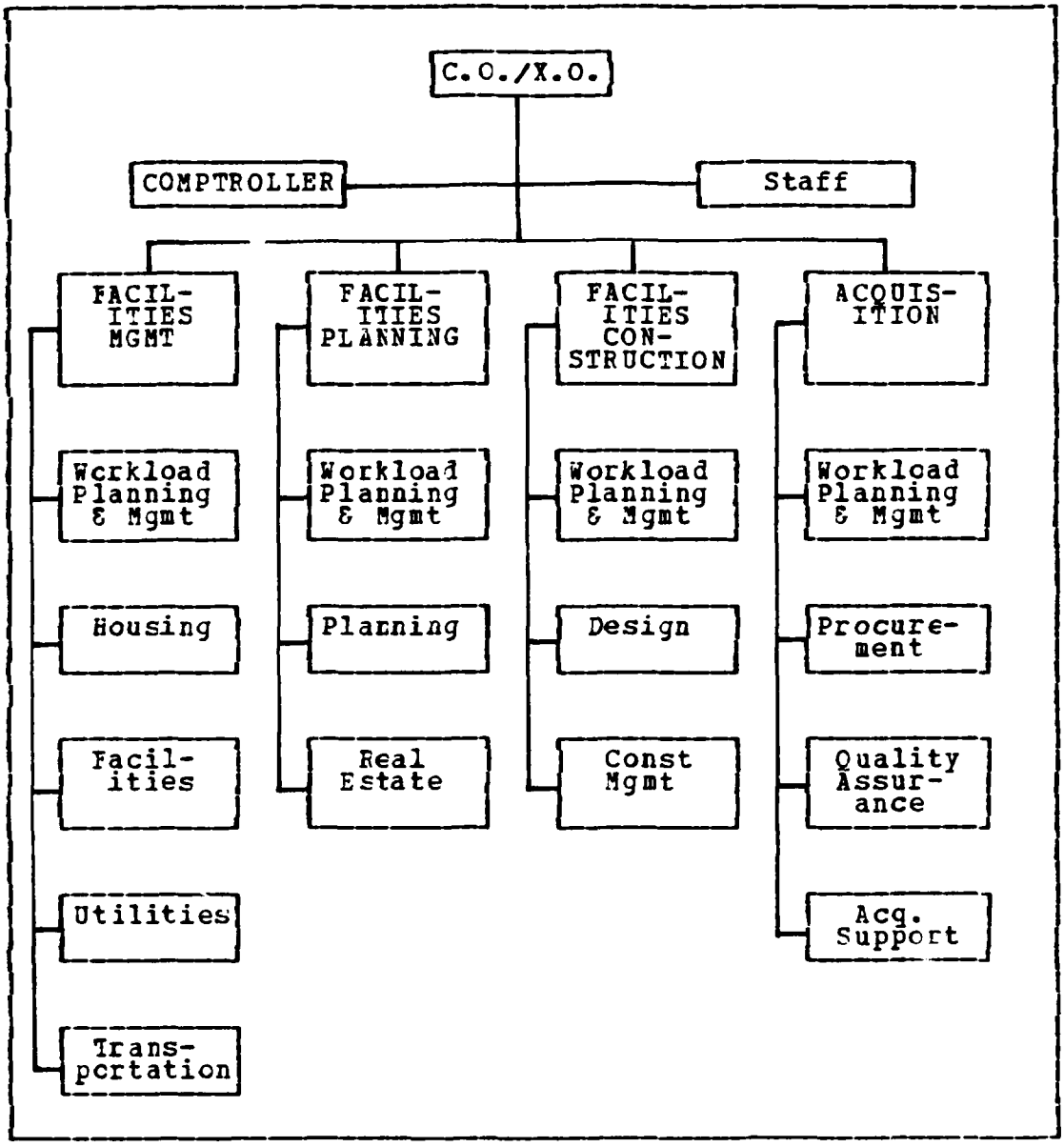


Figure 8.1 EFD Organization, Alternative #1.

one, (Figure 8.3), is a modification of the former organization structure. These five structures are not the only possible EFD structures, or perhaps not even five of the most desirable structures. They are included to allow the author to quantitatively determine the best structure of the

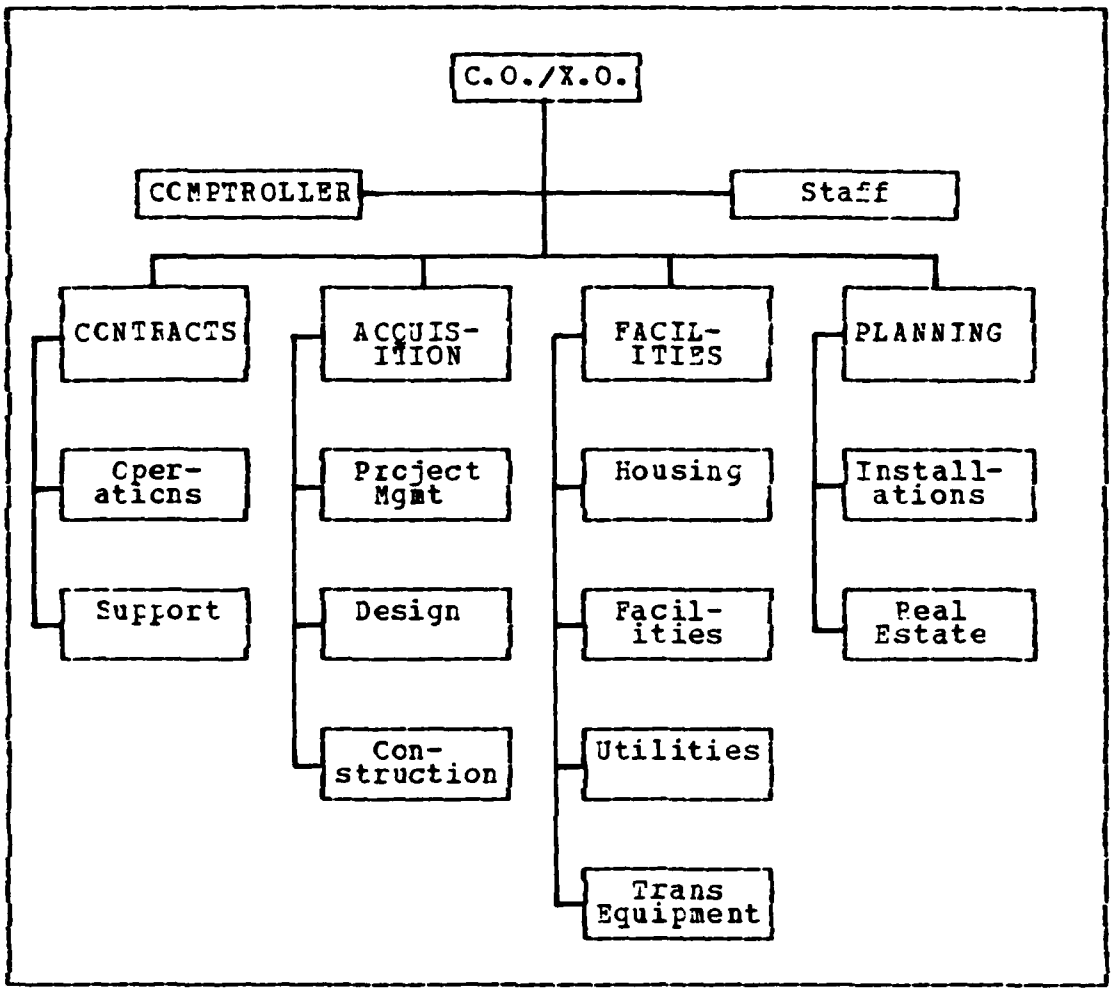


Figure 8.2 EFD Organization, Alternative #2.

three Quinn Ad Hoc Study Group alternatives, and to determine, by comparing these alternatives with the former structure, if the chosen structure is quantitatively supportable using the methodology.

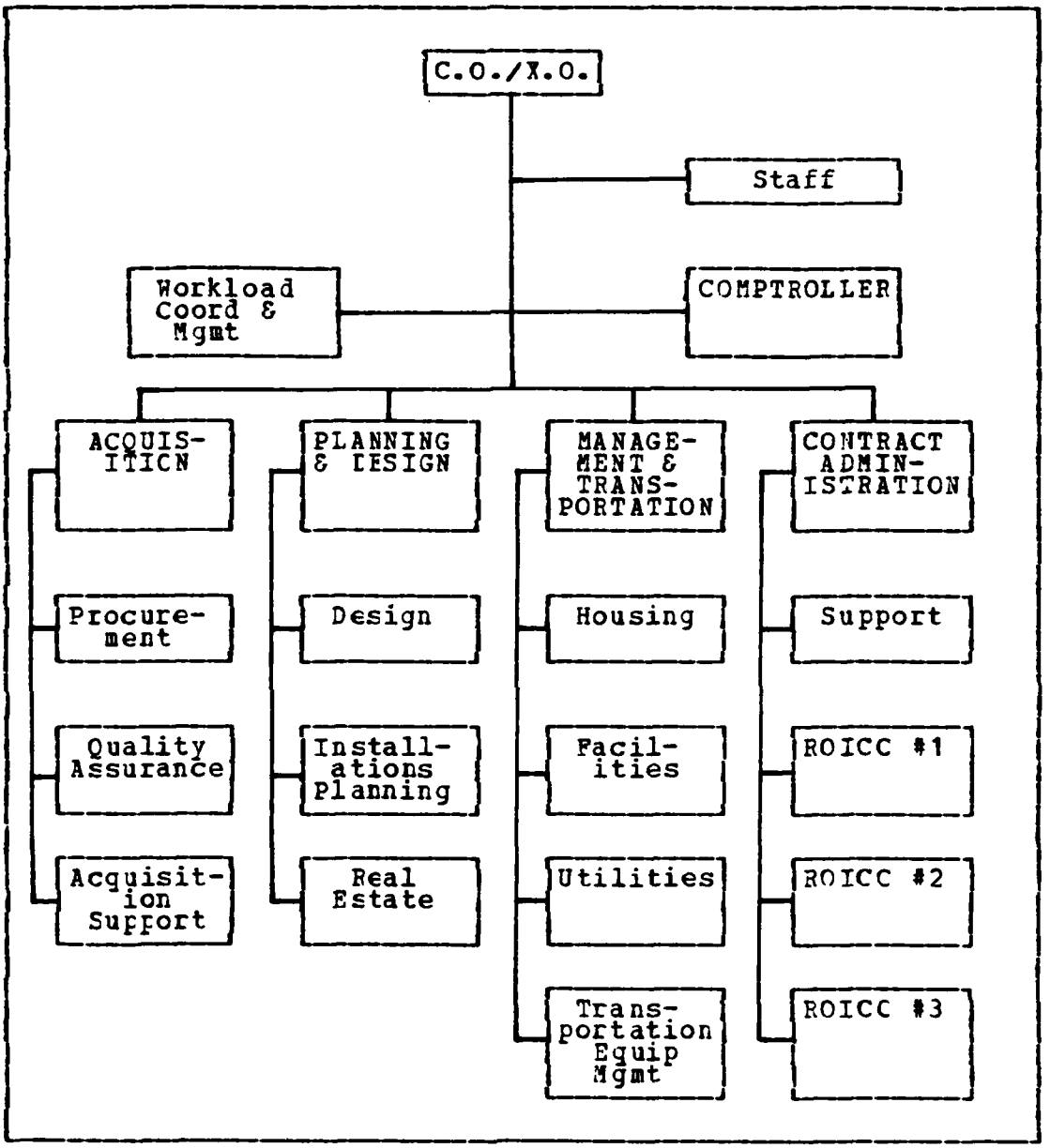


Figure 8.3 EFD Organization, Alternative #3.

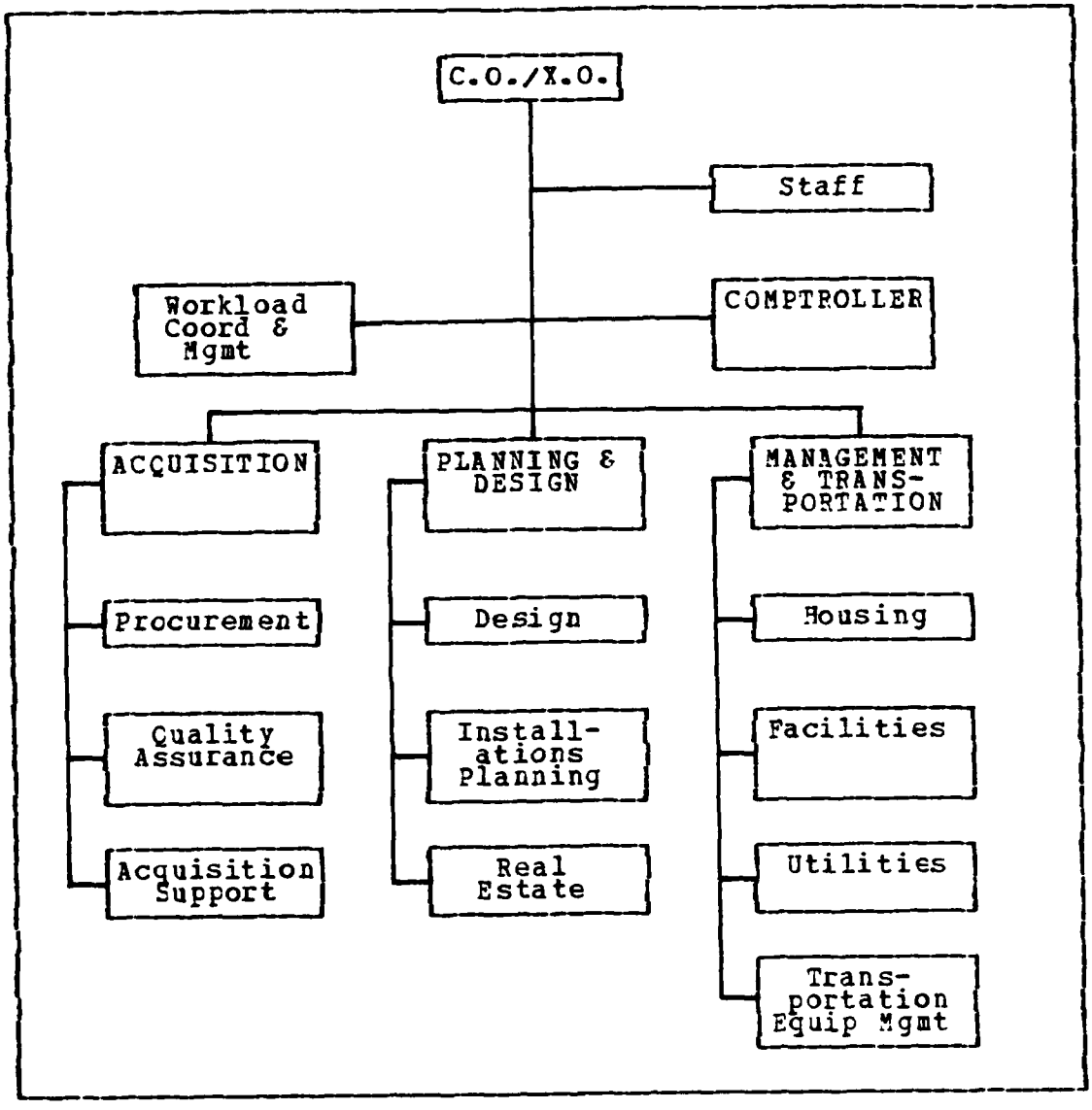


Figure 8.4 EFD Organization, Alternative #4.

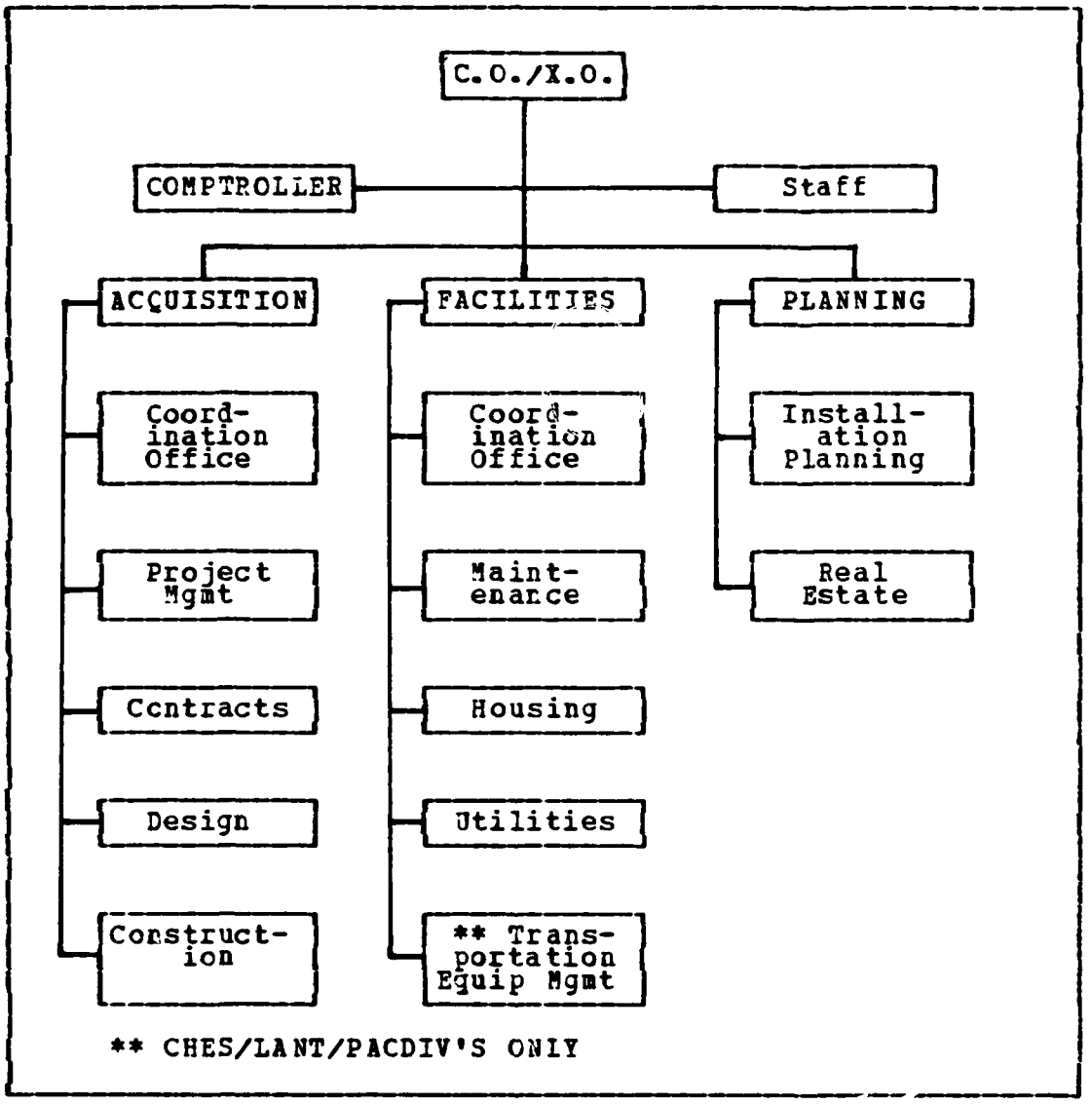


Figure 8.5 EFD Organization, Alternative #5.

C. SELECTING THE MOST APPROPRIATE STRUCTURE

Again the methodology requires constructing a matrix of alternatives and attributes. The methodology follows:

1. Identify the relevant attributes. All ten of the attributes that were described in Chapter 6 were selected by the author to evaluate the organization structures. These attributes are:
   a) The level of conflict resolution;
   b) The efficiency of the workflow;
   c) The efficient use of resources;
   d) The ability to cope with a changing and multifacitated environment;
   e) The ability to cope with task uncertainty;
   f) The independence of the contract administration function;
   g) Direct access of contracts personnel to the commanding officer;
   h) The equalizing of contracts personnel and technical personnel;
   i) The level of decentralization; and
   j) Promoting the professionalism of personnel.
2. Rank the attributes in order of importance. Table 6 shows the author's ranking of the attributes for the EFD organization.
3. Rate the attributes in importance, by assigning the least important attibute a rating of 10. The organization's fit with the environment was the lowest ranked attribute, so it was assigned a rating of 10. Following this the remaining attributes were rated, as shown in Table 7.
4. Normalize the weights given to the attributes. This is done by summing the weights and dividing each by the sum of the weights. Table 7 shows the results of normalizing the ratings.

TABLE 6

Ranking of EFD Attributes

RANK	ATTRIBUTE
1	Decentralization
2	Independent contract administration
3	Equal status for personnel
4	Conflict resolution level
5	Professional of personnel
6	Efficient use of resources
7	Efficient workflow
8	Access to the commanding officer
9	Task uncertainty
10	Environment

TABLE 7

Rating of EFD Attributes

RANK	ATTRIBUTE	RATING	NORMALIZED
1	Decentralization	100	.2500
2	Independence	80	.2000
3	Equal status	60	.1500
4	Conflict resolution	40	.1000
5	Professionalism	40	.1000
6	Resource efficiency	25	.0625
7	Efficient workflow	20	.0500
8	Access to c.o.	15	.0375
9	Task uncertainty	10	.0250
10	Environment	10	.0250
	TOTAL	400	1.0000

5. For each attribute, rate the alternatives. The author's rating of the attributes and alternatives is shown in Table 8.
6. Calculate the utility of each alternative. This is done by multiplying the utility value of each attribute (step 5) by the weight of that attribute (step 4) and summing up the values. The results of the author's calculations are listed in Table 8.
7. Select the alternative with the greatest overall score. Standard deviations were computed for the

utility values. Figure 8.6 shows graphically the computed utility value of each alternative structure, plus and minus one standard deviation. Figure 8.6 shows that alternatives #3 and #4 have a greater utility value than either the pre 1985 organization (alternative #5) or the selected organization structure (alternative #2). Of course the utility values computed are based on judgemental decisions of the author. Using different attributes, weights, and utility values could change the outcomes of the author's calculations.

D. CHECKING FOR APPROPRIATENESS

Alternative #4 is the preferred organization of the Quinn Ad Hoc Study Group and alternative #3 is a variation of that structure. The difference between alternatives #3 and #4 is that the contract administration function, performed by the ROICC offices, has been moved from under the control of the Acquisition department and made a separate department in alternative #3. This move could decrease the affect that the engineers (of the Acquisition Department) are having over the contracts personnel and put both the contracts and quality assurance personnel on a more even organizational plateau.

The structure also lends itself to decentralization of the ROICC function, and the recognition that contract administration is not the same as determining the specifications and awarding the contract. Not only is decentralization possible, but the goals of each department are oriented toward the deliverance of a complete product.

TABLE 8

Rating of EFD Alternative Structures

ATTRIBUTE	WGT	ALT #1 (1)	ALT #1 (2)	ALT #2 (1)	ALT #2 (2)	ALT #3 (1)	ALT #3 (2)	ALT #4 (1)	ALT #4 (2)	ALT #5 (1)	ALT #5 (2)
Decentralization	.2500	8	2.000	2	0.500	10	2.500	8	2.000	8	2.000
Independence	.2000	5	1.000	5	1.000	5	1.000	10	1.000	5	1.000
Equal	.1500	10	1.500	5	0.750	10	1.500	10	1.500	10	1.500
Conflict resolution	.1000	4	0.400	4	0.400	10	1.000	10	1.000	8	0.800
Professionalism	.1000	5	0.500	10	1.000	5	0.500	5	0.500	5	0.500
Resource efficiency	.0625	5	0.312	10	0.625	10	0.625	10	0.625	10	0.625
Workflow efficiency	.0500	6	0.300	2	0.100	10	0.500	10	0.500	8	0.400

Table 8

Rating of EFD Alternative Structures (cont'd.)

ATTRIBUTE	WGT	ALT #1 (1)	ALT #1 (2)	ALT #2 (1)	ALT #2 (2)	ALT #3 (1)	ALT #3 (2)	ALT #4 (1)	ALT #4 (2)	ALT #5 (1)	ALT #5 (2)
Access	.0375	5	0.188	10	0.375	5	0.188	5	0.188	5	0.188
Task	.0250	8	0.200	5	0.125	10	0.250	10	0.250	10	0.250
Environ-ment	.0250	10	0.250	4	0.100	10	0.250	10	0.250	10	0.250
TOTALS	1.0000		6.650		4.975		8.313		8.813		7.513
STANDARD DEVIATION			0.629		0.344		0.718		0.710		0.597

(1) Utility values
(2) Weighted utility values

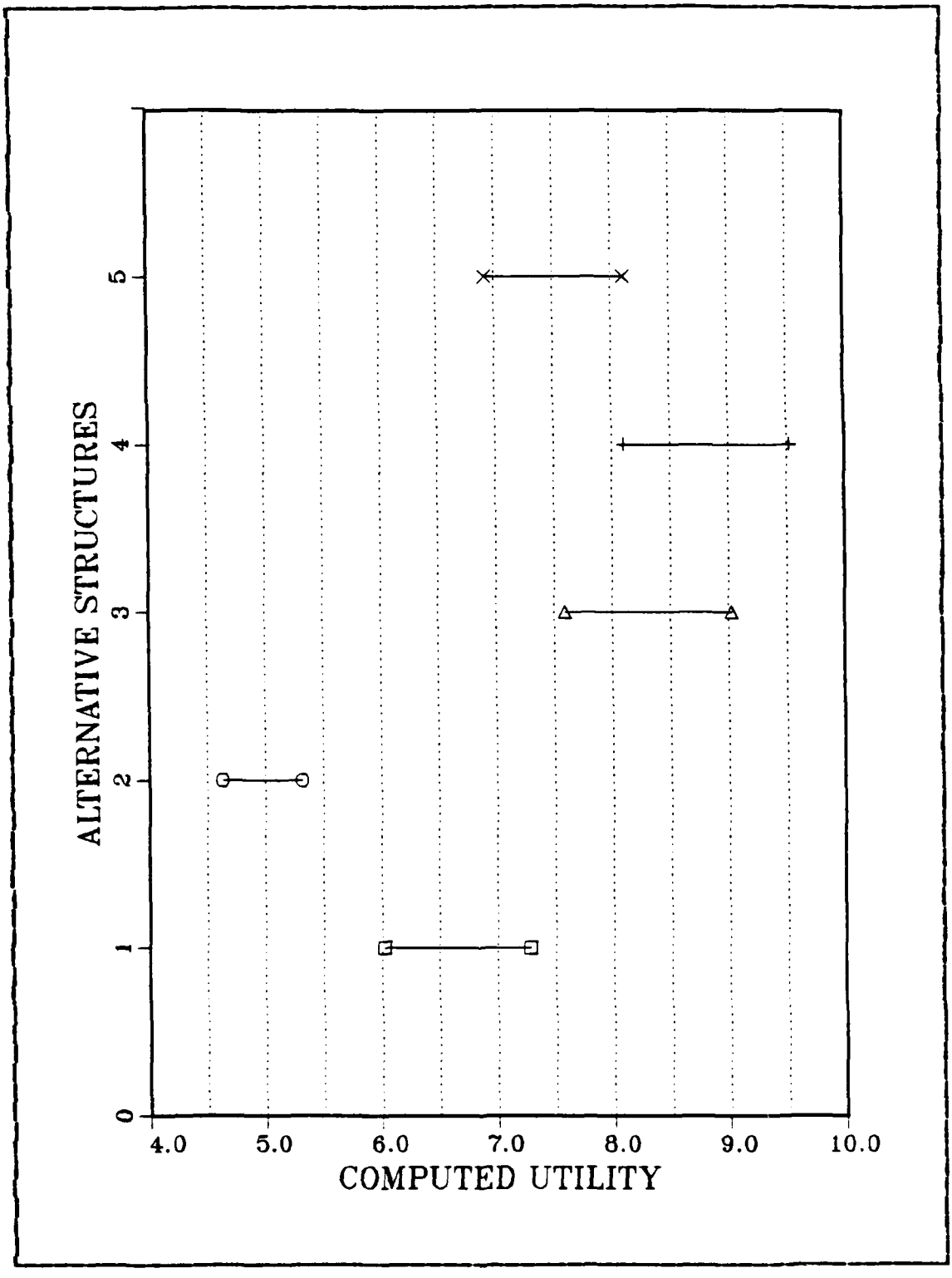


Figure 8.6 Utility of EFD Alternative Structures.

IX. THE INDEPENDENT ROICC OFFICE

A. INTRODUCTION

The last organizational structure to examine is the contract administration organization of the Resident Officer In Charge of Construction (ROICC) office. Contract administration in major weapons systems is accomplished through field activities such as Navy Plant Representative Offices (NAVPROs), Defense Contract Administration Services (DCAS) offices, and Supervisor of Shipbuilding and Repair (SUPSHIPS) offices. These contract administration offices exist to support the procurement contracting officer and the program manager of major weapon systems acquisitions. When so tasked these contract administration offices carry out the administration of the contracts assigned to them by the Headquarters commands of NAVAIR and NAVSEA. Additional information on the organization of a NAVPRO and a DCAS office is contained in Appendix E.

B. THE ORGANIZATIONAL STRUCTURES

Four possible organizational structures are shown in Figures 9.1 through 9.4. One of these organizational structures is utilized by a NAVPRO (alternative #1), one is utilized by a DCAS office (alternative #2), one is a product organization (alternative #3), and the other is a standard ROICC office (alternative #4). In the current EFD organization the ROICC reports to their Officer In Charge of Construction (OICC), who is or reports directly to the EFD Commander. The ROICC also takes direction from the Construction Division.

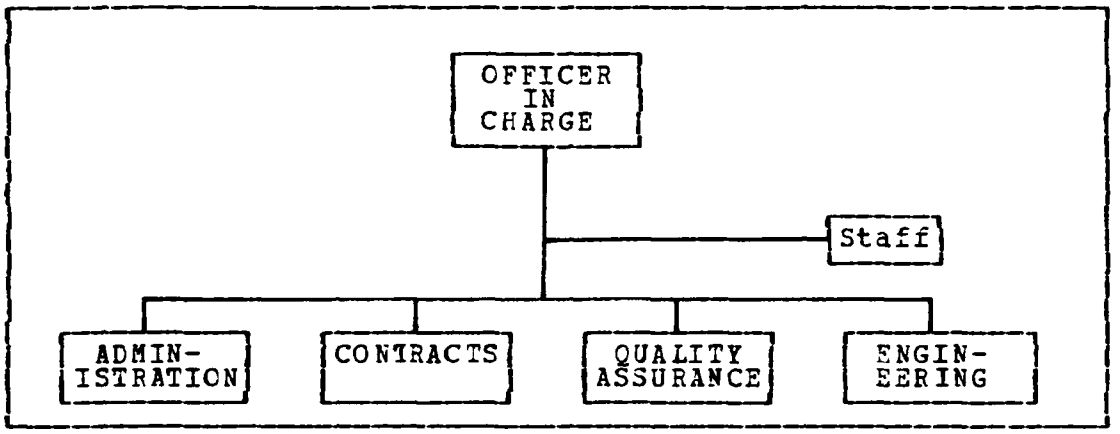


Figure 9.1 ROICC Organization, Alternative #1.

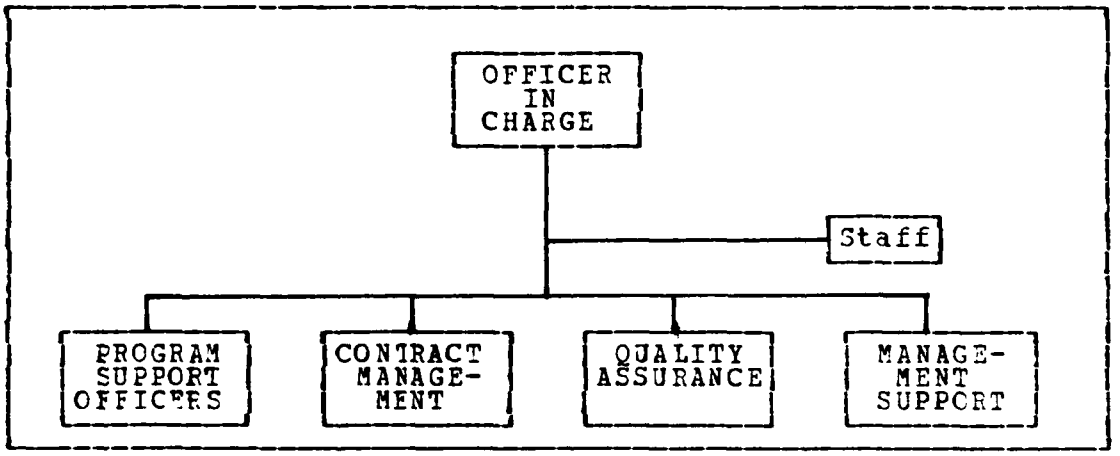


Figure 9.2 ROICC Organization, Alternative #2.

functional organization another organization for coordination, with lateral authority. Consequently matrix organizations are characterized by both lateral and vertical lines of authority. In a matrix organization an integrator is given lateral authority to integrate programs or functions which cut across independent departments of an organization. An organizational diagram of a matrix organization is shown in Figure B.2. The advantages and disadvantages of this type of organizational structure are shown in Table 13.

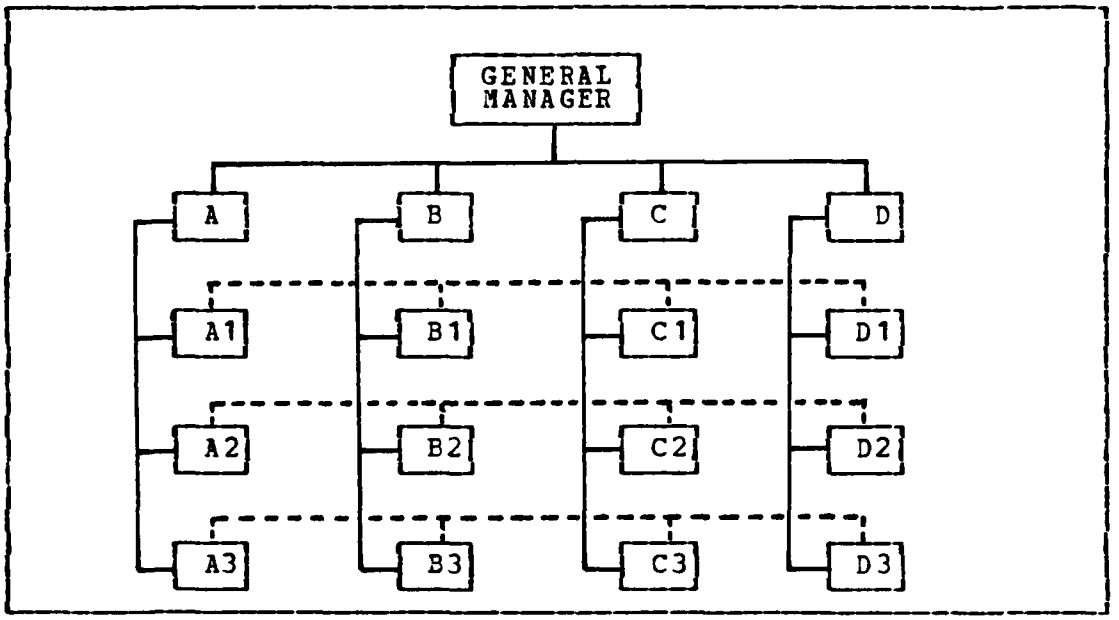


Figure B.2 Matrix Organization Model.

3. Product Organization

In a product or service organization, divisions are grouped by differences in markets or output categories rather than differences in member skills or inputs. For instance, a company might have an international sales division, retail sales division, and wholesale sales division.

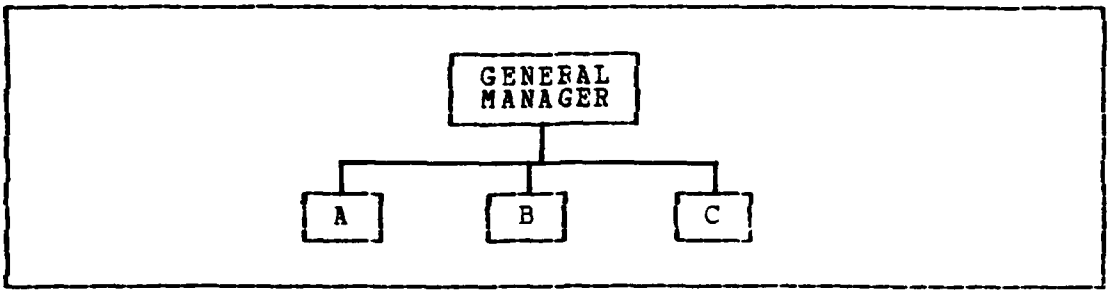


Figure B.1 Functional Organization Model.

TABLE 12

Summary of Functional Departmentation

ADVANTAGES	DISADVANTAGES
1. Fosters professional identity and career.	1. Creates major differences between departments.
2. Ease of supervision.	2. Conflicts take longer to resolve.
3. Allows maximum specialization in trained occupational skills.	3. Responsibility for performance is difficult to trace.
4. Other departments have access to specialized skills.	4. Fails to develop well-rounded managers.
5. Logical reflection of functions.	5. Responsibility for overall performance is at the top only.
6. Follows principle of occupational specialization.	6. Overspecializes and narrows the viewpoints of key personnel.
7. Maintains power and prestige of major functions.	7. Reduces coordination between functions.
8. Simplifies training.	
9. Means of tight control is at the top.	

2. Matrix Organization

A matrix organization is a version of a functional organization. One of the disadvantages of a functional organization is the coordination of activities. To overcome this weakness the matrix organization imposes over the

APPENDIX B
BASIC ORGANIZATION STRUCTURES

A. INTRODUCTION

This appendix provides information on the functional, product, and collegial organizations. Variations of these basic structures, the geographic departmentation and the matrix organization, are also presented in this appendix.

Why one organizational structure is chosen over another is a function of that particular organizational structure's strengths and weaknesses. The purpose of this appendix is to provide background information on these various organizational structures, including the advantages and disadvantages of each structure.

1. Functional Organization

In a functional organization tasks are grouped around occupational skills, with departments staffed by occupational skill rather than by a specific product. These organizational structures can be found in process or mass production firms. Coordination of the workflow is performed by a general manager or by a general manager aided by staff specialists. This form of organization is found in vertically integrated firms, where one department processes inputs from the previous department and passes its output to successive departments in the chain of operations. In the functional organization the day-to-day decision making is centralized in the general manager. Day-to-day coordination occurs in the brains of the managers. [Ref. 21: pp. 105-107] An organizational diagram of a functional organization is shown in Figure B.1. The advantages and disadvantages of this type of structure are shown in Table 12.

APPENDIX A

PUBLIC LAW 98-191

Public Law 98-191 of 1 December 1983, the Office of Federal Procurement Policy Act Amendment, amended section 8A of the original Act to read:

a) "To further achieve effective, efficient, and economic administration of the federal procurement system, the head of each executive agency shall-

b) increase the use of full and open competition in agency procurements in accordance with subsection (b);

c) ensure that agency procurements are carried out in accordance with all laws, Government-wide policies and regulations, and good business practices;

d) establish clear lines of authority, acccuntability, and responsibility for procurement decisionmaking, including placing the procurement function at a sufficiently high level in the agency to provide-

   1. direct access to the head of the major organizational element served; and

   2. comparative equality with organizaticnal counterparts;

e) designate a senior procurement executive who shall be responsible for management direction of the procurement system, including unique agency policies and regulations and agency system standards, and who shall serve as the advocate for competition in accordance with subsection (c);

f) develop and maintain a procurement management career program to ensure an adequate professional work force;

g) establish and maintain procurement records in accordance with subsection (d); and

h) prepare and submit annual reports in accordance with subsection (e)." [Ref. 23: pp. H-3436-H3439]

that significant improvement can be realized by changing the ROICC office organizational structure. It is recommended that ROICC office structures be analyzed in more depth and that more options be examined in an attempt to determine a better organization structure.

XI. RECOMMENDATIONS

The recommendations of this study are:

1. A quantitative methodology should be used to determine the best NAVFAC structure. The methodology should be used to determine which organizational structure appears most appropriate when given a choice of multiple organization structures. Several individuals could evaluate the structures using the methodology to produce a composite score. Appendix F is a worksheet designed to provide input from several personnel for the purpose of determining the most appropriate EFD organization structure.
2. An organization structure should not be modeled after other organization structures. An organization's structure should not be copied or duplicated simply for the sake of conformity. The other organization's structure might be considered as an alternative and evaluated, as this author has done, against other possible organization structures. Management should select an organization structure that fits with their environment and strategy.
3. Implement the Quinn Ad Hoc Study Group preferred organization. Quantification of several attributes judgementally selected and weighted by the author indicate that the most appropriate EFD organization structure is that recommended by the Quinn Ad Hoc Study Group (see Figure 8.4). The author recommends that the Quinn Ad Hoc Study Group recommended organization be implemented.
4. Change the structure of the ROICC offices. The author's application of the methodology indicates

one best organization structure for the EFD and the ROICC office cannot be determined, it was quantitatively shown that other organization structures were more appropriate for the organizations.

X. CONCLUSIONS

The conclusions of this study are:

1. Organizational structures can be quantitatively evaluated. This may be done by using a form of multiattribute utility measurement as described in this thesis. Given several alternative structures from which to choose, multiattribute utility measurement will help one to quantify what would otherwise be a very subjective decision. The methodology allows one to select those attributes that are considered most appropriate and to assign a relative importance to those attributes. The methodology therefore presents a good model of something decision makers would otherwise do in a rather subjective way.
2. Each activity should be designed to enhance specific attributes. Because attributes vary from activity to activity, an organization should not be modeled exactly after another organization's structure. Each activity's structure should, more appropriately, be designed for the needs of that activity.
3. Listing, rating, and ranking attributes is a useful exercise. The exercise of listing, ranking, and rating the attributes is itself useful to management for clarifying the organization's strategy and purpose. It motivates management to examine the goals of the organization and appraise the effectiveness of the structure in promoting those goals.
4. Using the methodology revealed that the EFD and ROICC office structues should be modified. In Chapters 8 and 9 the author calculated utility values for alternative EFD and ROICC office structures. While the

through their existence as equal departments. Those two organization structures emphasize the point that not only are both contracts and quality assurance equal players, but that both groups are equally needed to manage a construction project.

An advantage of the matrix type organization (alternative #3), is that it allows the resources assigned to a particular project to expand and contract as the project changes in scope. The role of the program manager is ideal for junior officers, and could be supplemented with civilian program managers for continuity and guidance to the military members.

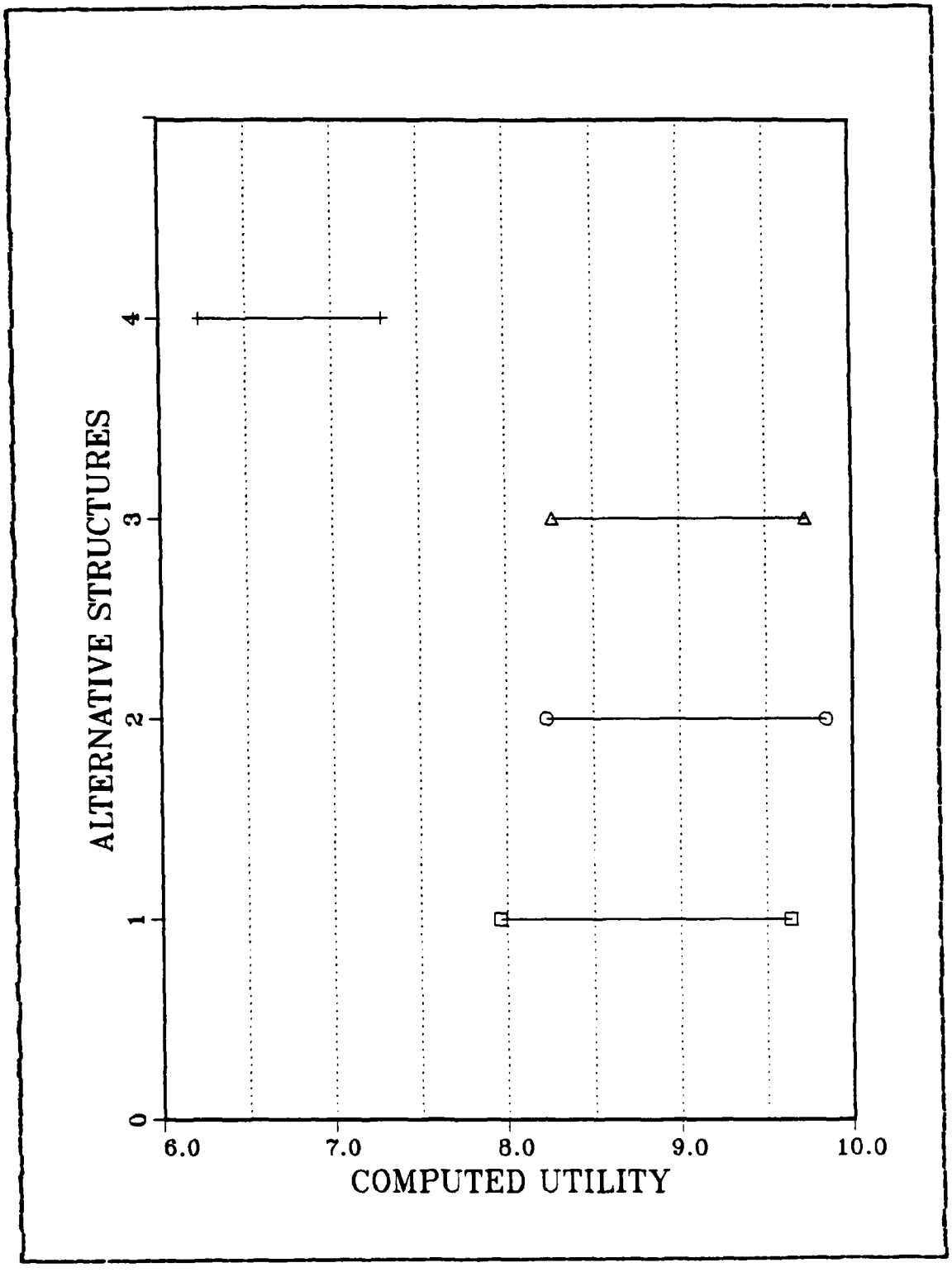


Figure 9.5 Utility of ROICC Alternative Structures.

TABLE 11

Rating of ROICC Alternative Structures

ATTRIBUTE	WGT	ALT #1 (1)	ALT #1 (2)	ALT #2 (1)	ALT #2 (2)	ALT #3 (1)	ALT #3 (2)	ALT #4 (1)	ALT #4 (2)
Equal status	.240	10	2.40	10	2.40	10	2.40	5	1.20
Resources	.200	10	2.00	10	2.00	5	1.00	8	1.60
Professionalism	.200	10	2.00	10	2.00	10	2.00	5	1.00
Conflict resolution	.160	5	0.80	5	0.80	10	1.60	10	1.60
Efficiency of work-flow	.080	8	0.64	8	0.64	10	0.80	8	0.64
Task uncertainty	.080	8	0.64	10	0.80	10	0.80	5	0.40
Environment	.040	8	0.32	10	0.40	10	0.40	8	0.32
TOTALS	1.000		8.80		9.04		9.00		6.76
STANDARD DEVIATION			0.84		0.81		0.73		0.53

(1) Utility values
(2) Weighted utility values

D. CHECKING FOR APPROPRIATENESS

Figure 9.5 shows that three organization structures, alternatives #1, #2, and #3, were rated almost equally when standard deviation is considered. No one structure can be determined to be the best structure, but it can be concluded that alternative #4 is not an appropriate structure for the ROICC office.

One big advantage of the NAVPRO and DCAS type structures (alternatives #1 and #2) is that they give contracts personnel and quality assurance personnel the same status

organization's ability to cope with a changing and multifacitated environment was the lowest ranked attribute, so it was assigned a rating of 10. Following this the remaining attributes were rated, by the author, as shown in Table 10.

TABLE 10

Rating of ROICC Attributes

RANK	ATTRIBUTE	RATING	NORMALIZED
1	Equal status	60	.24
2	Resources efficiency	50	.20
3	Professionalism	50	.20
4	Conflict resolution	40	.16
5	Efficiency of workflow	20	.08
6	Task uncertainty	20	.08
7	Environment	10	.04
	TOTAL	250	1.00

4. Normalize the weights given to the attributes. This is done by summing the weights and dividing each by the sum of the weights. Table 10 shows the results of normalizing the ratings.
5. For each attribute, rate the alternatives. Table 11 shows the ratings of the various alternatives for each of the attributes.
6. Calculate the utility of each alternative. This is done by multiplying the utilty value of each attribute (step 5) by the weight of that attribute (step 4) and summing the values. The result of the author's calculations are listed in Table 11.
7. Select the alternative with the greatest overall score. Figure 9.5 shows graphically the results of computing the utility values plus and minus one standard deviation.

C. SELECTING THE MOST APPROPRIATE STRUCTURE

The steps are:

1. Identify the relevant attributes. From the list of attributes contained in Chapter 6, only seven were selected by the author. In the author's opinion the other five attributes, such as the level of decentralization, were not relevant to the ROICC office structure. The attributes selected by the author were:
   a) The level of conflict resolution;
   b) The efficiency of the workflow;
   c) The efficient use of resources;
   d) The ability to cope with a changing and multifacitated envircnment;
   e) The ability to cope with task uncertainty;
   f) The equalizing of contracts personnel and technical personnel; and
   g) Promoting the professionalism of personnel.
2. Rank the attributes in order of importance. Table 9 shows the author's ranking of the attributes of the RCICC organization.

TABLE 9

Ranking of ROICC Attributes

RANK	ATTRIBUTE
1	Equal status of personnel
2	Efficient use of resources
3	Professionalism of personnel
4	Conflict resolution level
5	Efficiency of workflow
6	Task uncertainty
7	Changing environment

3. Rate the attributes in importance, by assigning the least important attribute a rating of 10. The

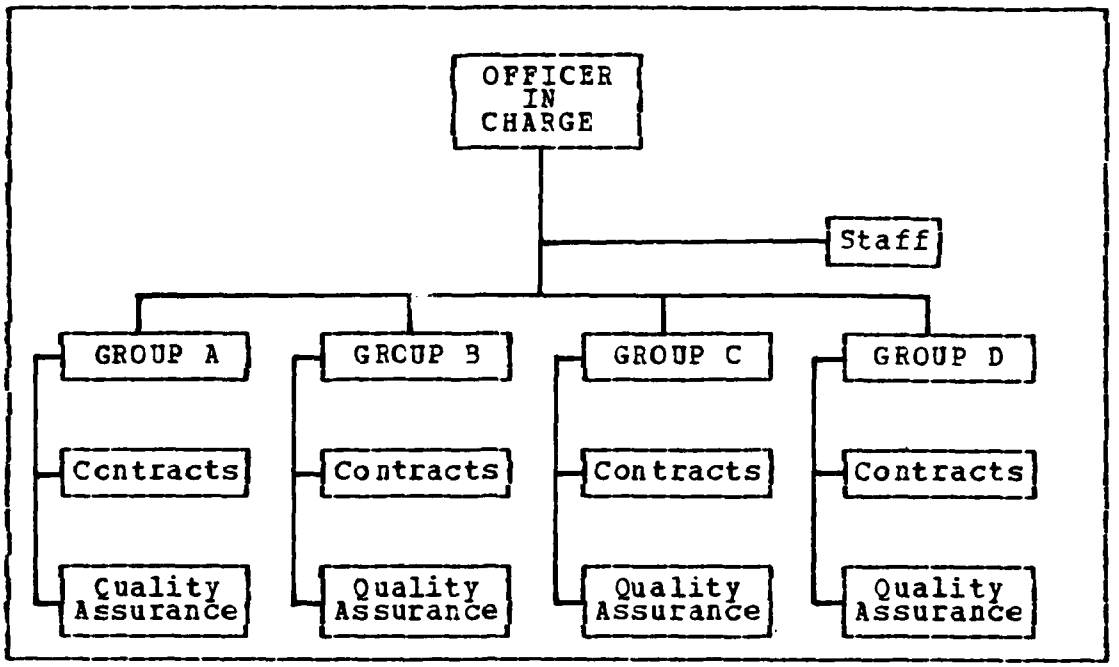


Figure 9.3 ROICC Organization, Alternative #3.

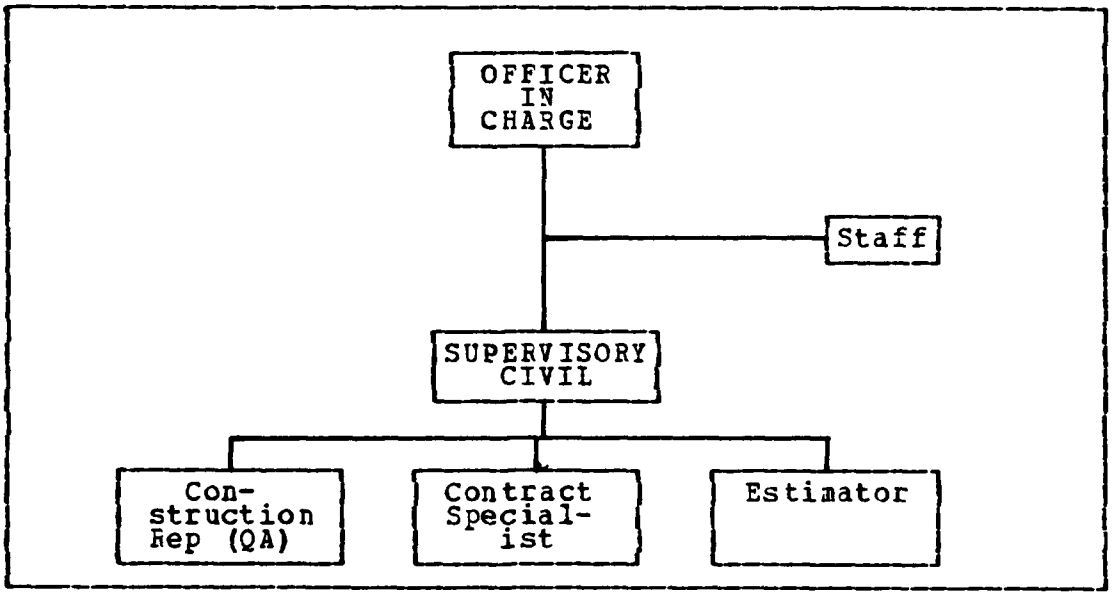


Figure 9.4 ROICC Organization, Alternative #4.

TABLE 13

Summary of a Matrix Organization

ADVANTAGES	DISADVANTAGES
1. Work is coordinated in the best interest of the organization. 2. It equalizes power differences and increases trust in the joint-decision process. 3. The interacting role has a wide range of contacts and exposures.	1. The dual lines of authority can create power struggles. 2. Some managers may view the organization as complete disorganization. 3. There may develop an overdependence on group decision making, slowing down decision making. 4. Higher overhead costs will be incurred to support additional managers. 5. The organization can become so concerned with conflict resolution, team development, and decision making that customer concerns are neglected.

The divisions cater to three different markets. This type of organization promotes job enlargement, increasing the time cycles at the group work level, and decentralization. Day-to-day coordination now occurs in the brains of the operators and the middle managers, as opposed to occurring in the brains of the general manager. The general manager still communicates orders, but there are fewer of them, since he no longer performs the function of day-to-day coordination. Orders may now be stated in broad objectives. This form of organization is most often found at the firm level in product or geographic divisions of operating activities. [Ref. 21: p. 107] An organizational diagram of a product organization is shown in Figure B.3. The advantages and disadvantages of a product organization are shown in Table 14.

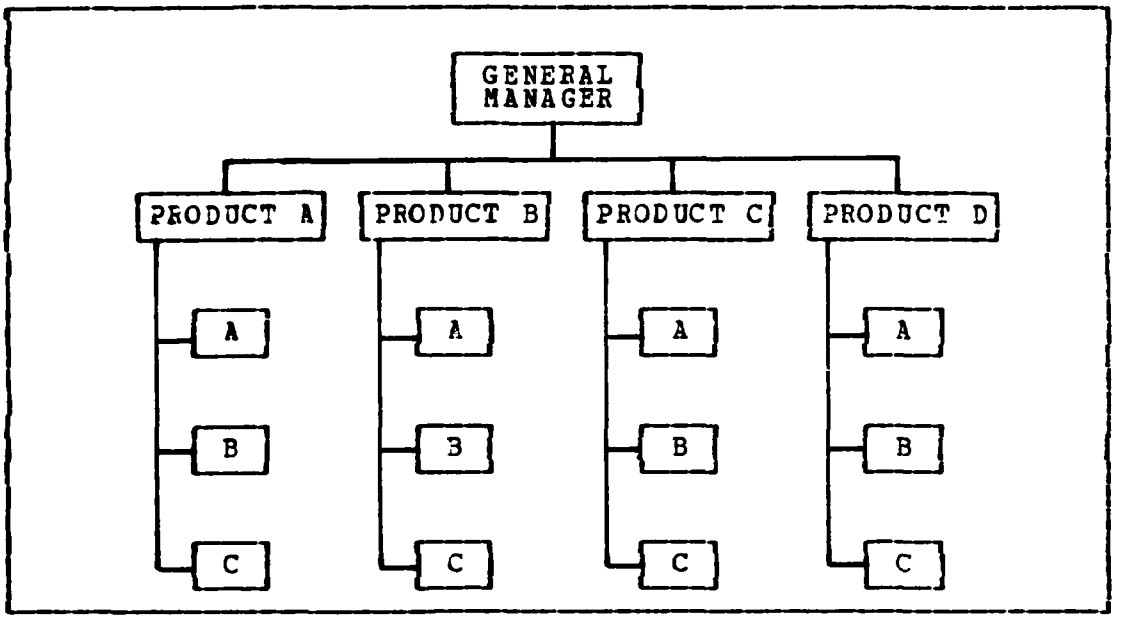


Figure B.3 Product Organization Model.

4. Geographical Organization

A version of the product organization is the geographical organization. In the geographical organization product divisions are established in geographical areas to serve that particular area; for example, in the beverage industry bottlers are assigned geographical areas to service. The six EFDs is another example of a geographical organization; each EFD is designated a particular geographical area that it is to service. The advantages and disadvantages of the geographical organization are shown in Table 15.

B. THE COLLEGIAL ORGANIZATION

In the collegial organization all members enjoy equal status. This type of organization is often seen in partnerships such as law firms, doctors, and accountants. In the

TABLE 14

Summary of Product Departmentation

ADVANTAGES	DISADVANTAGES
1. Simplifies coordination among functions.	1. Duplication of resources between departments.
2. Permits large growth without loss of control.	2. Reduces specialization in occupational skills.
3. Permits accountability for performance.	3. Encourages competition among divisions.
4. Divisional goals are clear, providing motivation for divisional management.	4. Encourages suboptimization.
5. Decision authority is moved closer to the problem.	5. Requires more persons with general manager abilities.
6. Furnishes measurable training ground for general managers.	6. Tends to make maintenance of economical central services difficult.
7. Permits growth and diversity of products and services.	7. Presents increased problem of top management control.
8. Places responsibility for performance at the divisional level.	

collegial organization it is not possible to predict who does what in the organization. It is a free-form, dynamic, informal system. Some literature suggests that under certain conditions firms, hospitals, and large government gureaus do or should operate in this fashion. Other literature suggests that this form is appropriate for universities, think tanks, and R & D departments. [Ref. 21: p. 108] The collegial organization structure is shown in Figure B.4. The advantages and disadvantages of the collegial organization are shown in Table 16.

TABLE 15

Summary of Geographic Departmentation

ADVANTAGES	DISADVANTAGES
1. Simplifies coordination among functions. 2. Permits large growth without loss of control. 3. Permits accountability for performance. 4. Divisional goals are clear, providing motivation for divisional management. 5. Decision authority is moved closer to the problem. 6. Furnishes measurable training ground for general managers. 7. Permits growth and diversity of products and services. 8. Places responsibility for performance at the divisional level. 9. Places emphasis on local markets and products. 10. Takes advantage of economics of local operations. 11. Better face-to-face communication with local interests. 12. Improves coordination in a region.	1. Duplication of resources between departments. 2. Reduces specialization in occupational skills. 3. Encourages competition among divisions. 4. Encourages suboptimization. 5. Requires more persons with general manager abilities. 6. Tends to make maintenance of economical central services difficult. 7. Presents increased problem of top management control.

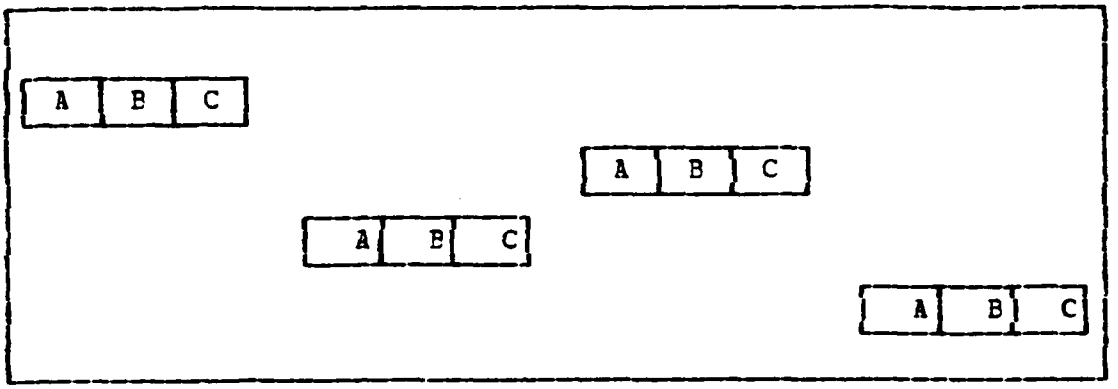


Figure B.4 Collegial Organization Model.

TABLE 16

Summary of Collegial Organization

ADVANTAGES	DISADVANTAGES
1. Promotes self-actualization for members. 2. Leads to more human growth. 3. Promotes stronger member commitment to the organization's goals. 4. Good communication channels.	1. Decision and Information systems are random. 2. Viewed by some as no structure at all. 3. Not possible to predict who will do what in the organization.

APPENDIX C
THE NAVAL AIR SYSTEMS COMMAND

A. INTRODUCTION TO THE NAVAL AIR SYSTEMS COMMAND

The Naval Air Systems Command (NAVAIR) is a major Navy buying command, established in 1966 as one of the five subordinate commands of the previous Naval Material Command. The mission of NAVAIR is to provide material support of Navy and Marine Corps aircraft weapons systems, including the aircraft, air launched systems, catapults, arresting gear, meteorological equipment, etc. Additionally it has responsibility for integration of aircraft weapons systems and for providing administrative and technical support and guidance. [Ref. 25: pp. i-iii]

B. THE FIRST ECHELON NAVAIR ORGANIZATION STRUCTURE

The first echelon of NAVAIR is shown in Figure C.1. The NAVAIR organization consists of several field activities and a Headquarters Command. The departmentation of NAVAIR is by product with each activity, including the Headquarters Command, responsible for a specific product or service. For instance, the Naval Air Propulsion Center and the Pacific Missile Test Center provide support of specific types of products (propultion and missiles). The Headquarters Command is responsible for policy and the procurement of major systems.

C. THE PROCURING ACTIVITY ORGANIZATION STRUCTURE

NAVAIR's procuring activity for major weapons systems is the Headquarters organization. The procurement of major

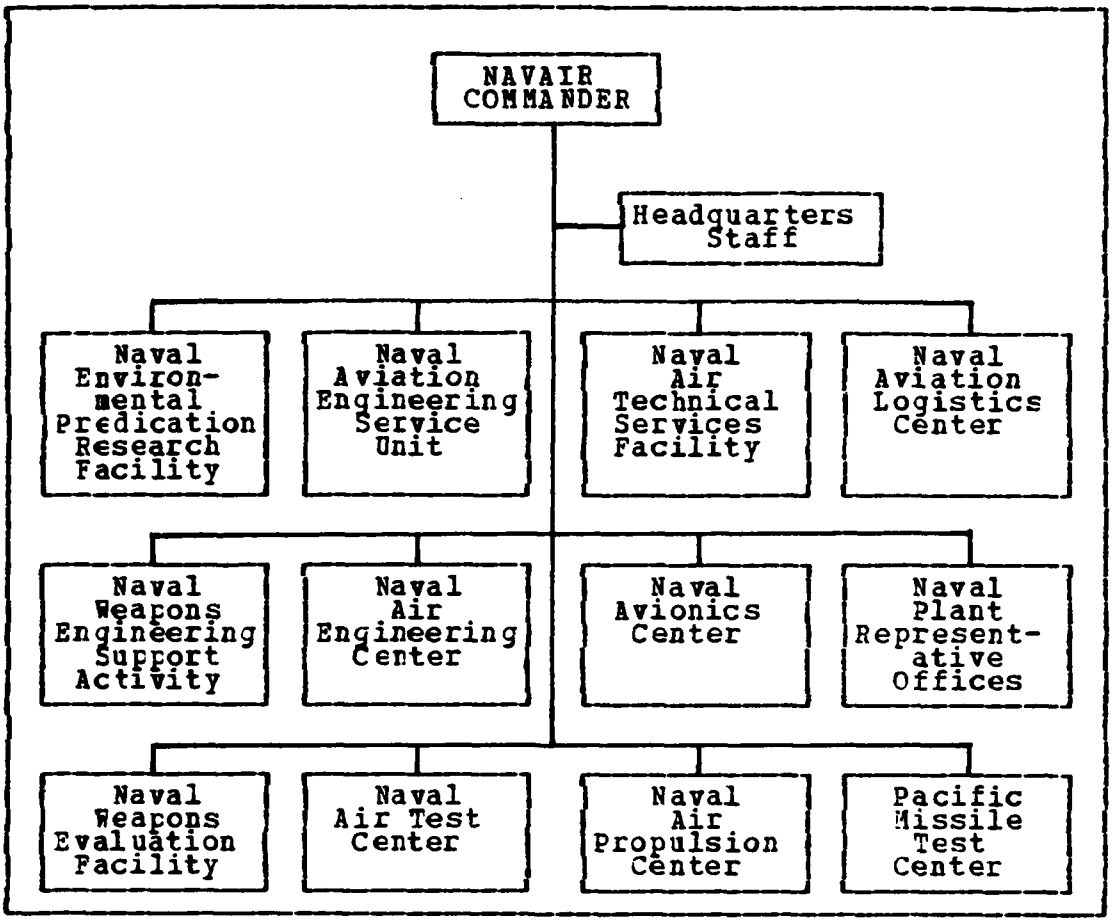


Figure C.1 The Naval Air Systems Command.

weapons systems is centralized at the Headquarters command. Within the Headquarters command the departmentation is by function, with, for instance, the contracts personnel being functionally departmentalized and reporting directly to the Headquarters Commander. The organizational chart of the Headquarters Command is shown in Figure C.2. It is important to note that NAVAIR, although organized functionally, also employs a matrix organization for project management. One of the disadvantages of a functional organization is the tendency to reduce coordination between divisions, and to emphasize the functional group to which one is assigned.

One method of overcoming that weakness, utilized by NAVAIR, is to use project managers and a matrix organization.

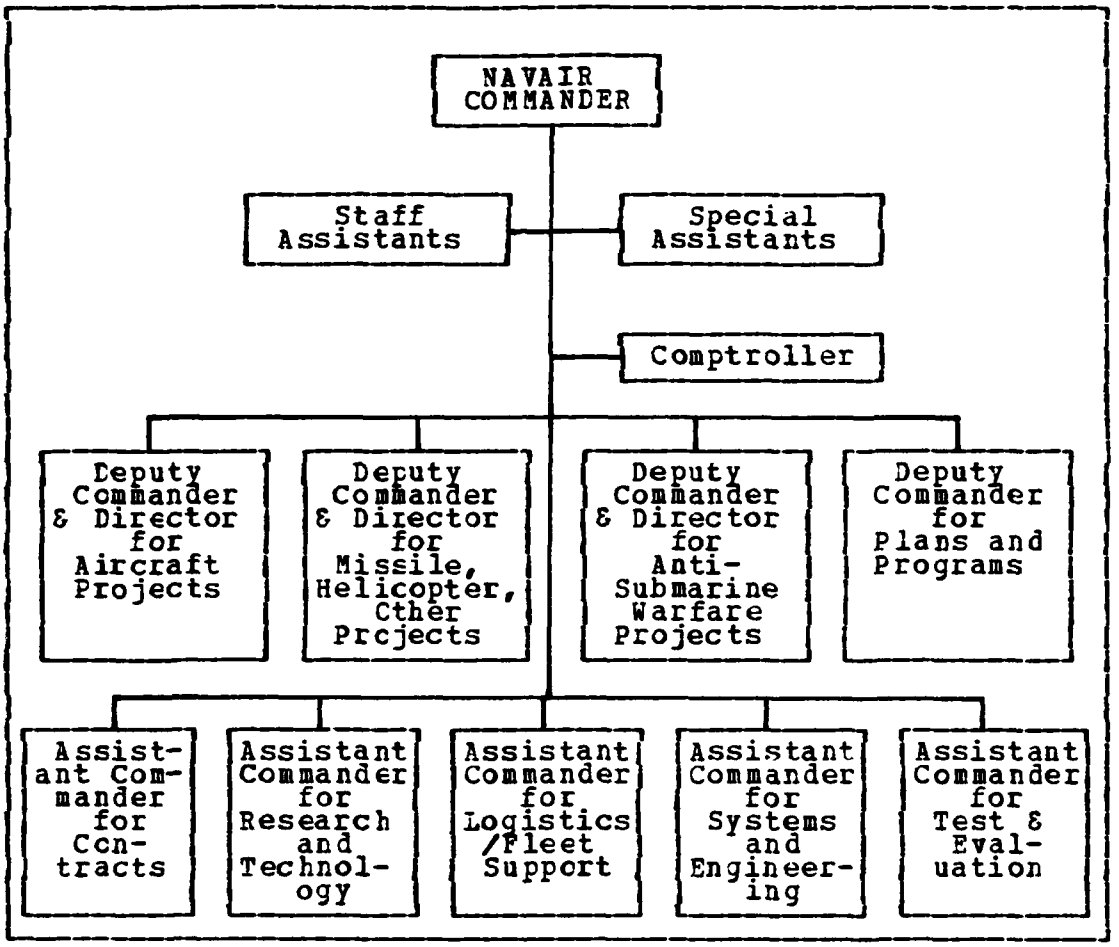


Figure C.2 NAVAIR Headquarters Organization.

D. THE CONTRACT ADMINISTRATION ORGANIZATION

Contract administration of NAVAIR contracts is performed by one of two activities, a Naval Plant Representative Office (NAVPRO) or a Defense Contract Administration Services Office (DCAS). The organizational structure of these activities is shown in Appendix E. These two

organizations have two different chains of command. The NAVPRO is assigned to NAVAIR and reports to AIR-519 [Ref. 26: p. 519-3]. The DCAS office, either a Defense Contract Administration Service Management Area (DCASMA) or a Defense Contract Administration Service Plant Representative Office (DCASPRO), reports to a Defense Contract Administration Service Regional Headquarters (DCASR) and through a chain of command totally outside the Secretary of the Navy's chain of command [Ref. 27: p. 20]. The important point here is that contract administration is done by a separate organization that, while not directly reportable to the program manager, exists to support the program manager.

APPENDIX D
THE NAVAL SUPPLY SYSTEMS COMMAND

A. INTRODUCTION TO THE NAVAL SUPPLY SYSTEMS COMMAND

The Naval Supply Systems Command (NAVSUP) is one of the five systems commands of the previous Naval Material Command. NAVSUP is responsible for the procurement of materials and services throughout the Navy for which no other procuring activity is otherwise delegated procurement authority.

NAVSUP contentrates on the procurement of logistic supplies such as spare parts, resale items, and consumables. Like NAVFAC the users of NAVSUP services are located around the world, and unique requirements exist at practically every facility or naval activity. NAVSUP procures both unique and common use supplies. NAVSUP, like NAVFAC, exists to support the operating forces. [Ref. 28: pp. 1-4]

B. THE FIRST ECHELON NAVSUP ORGANIZATION STRUCTURE

The NAVSUP organization is shown in Figure D.1. The NAVSUP organization is both product and geographically departmentalized to support the two different groups it provides resources to, the unique users and the users of common items. The Headquarters command is organized to provide both advice to its field activities and to procure resources.

At the Headquarters level NAVSUP is organized by product, which allows each deputy commander to function independently, and allows the Commander, NAVSUP, to supervise twenty subordinates. The three inventory control activities, Naval Aviation Supply Office, Navy Ships Parts

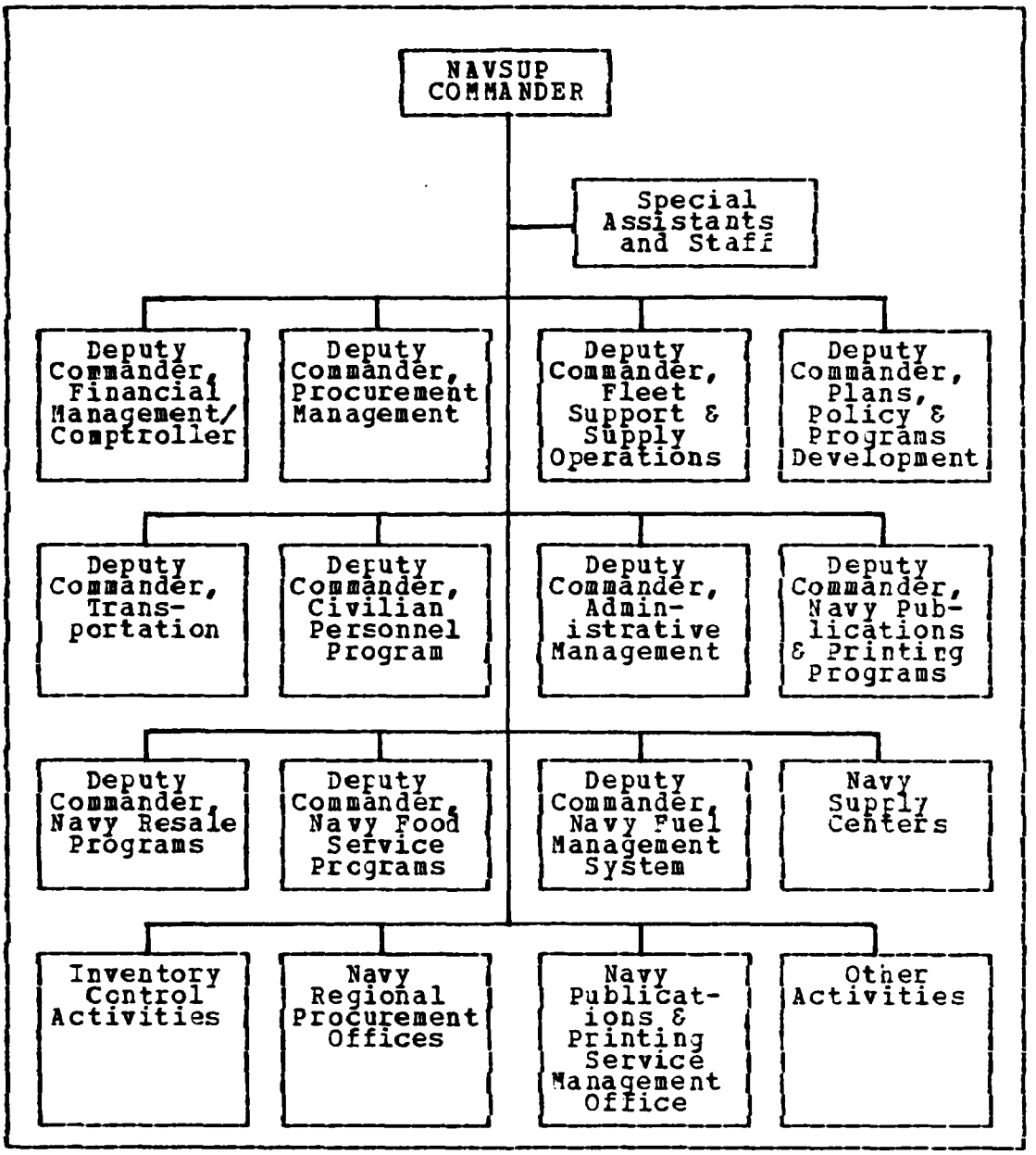


Figure D.1 NAVSUP Headquarters Organization.

Control Center, and Navy Resale System Office, specialize in the procurement of a particular type of product. Procuring all aviation or shipboard spare parts through a central activity promotes expertise in the procurement of supplies,

allows NAVSUP to buy in economic order quantities, and promotes the buying of standardized parts. By grouping all aviation buyers together NAVSUP has more control over the procurement of aviation spare parts.

C. THE PROCURING ACTIVITY ORGANIZATION STRUCTURE

NAVSUP conducts its buying through three major organizations; the Supply Centers (and Depot), the Regional buying activities, and the inventory control activities. None of the procurement activities of NAVSUP are very similar to the EFD. The Supply Centers only procure materials; they do not provide technical advice. The Regional buying center does provide technical advice and procure materials, but the materials procured do not require supervision of the vendor's quality control program. The inventory control points also do not procure items requiring supervision of the vendor's quality control program, and they utilize centralized procurement. An organization diagram of a regional buying activity, the activity closest in mission to that of an EFD, is shown in Figure D.2.

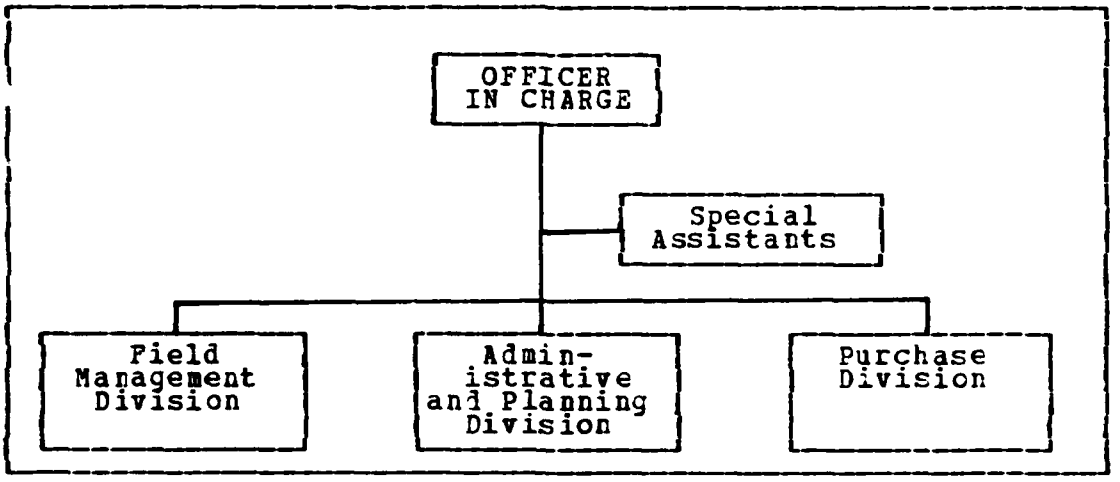


Figure D.2 NAVSUP Regional Procurement Office.

APPENDIX E
CONTRACT ADMINISTRATION ORGANIZATIONS

This appendix contains information on two contract administration organizations utilized by the Navy, and the Department of Defense, for the administration of contracts. The information presented is not intended to be indicative of how all Navy Plant Representative Offices (NAVPROs) are organized or how all Defense Contract Administration Services Plant Representative Offices (DCASPROs) are organized. The information is instead presented as an example of how two contract administration offices are organized in an effort to stimulate discussion on the appropriateness of the ROICC organization structure.

A. WHY CONTRACT ADMINISTRATION IS NECESSARY

Navy procurement can be classified as one of two types: procurement of off-the-shelf items and procurement of systems, facilities, and parts that are built to specifications. In the procurement of off-the-shelf items the item being procured is not being built under government supervision. It might be built to government specifications but it is not technically complex enough to require continuous government monitoring of the production process.

In the procurement of systems, parts, and facilities built to specifications, it is necessary to monitor the contractor's actions to ensure that the item being procured fulfills all of the government's requirements. As the procurement proceeds the emphasis shifts from research and development to full scale development to actual production, or in facilities from design to the actual construction.

The contractual emphasis also shifts at this point from the preaward process, including solicitation, source selection and possibly negotiation, to insuring that the terms and conditions of the contract are met. There two contract phases, preaward and postaward, utilize different personnel with different skills (in both the NAVAIR and NAVSEA organizations). In major weapons systems procurement the surveillance and monitoring functions are performed by specialists in the field, under the administrative contracting officer, under formal delegation by the procuring contracting officer. These field activities, such as a NAVPRO and a DCASPRC, concentrate solely on contract administration. In NAVFAC the ROICC offices exist to administer construction contracts originated by the EFD or another activity.

B. A NAVY PLANT REPRESENTATIVE OFFICE

> "The mission of the Naval Plant Representative Office, Minneapolis, is is provide contract administration services on assigned contracts, related to the procurement of materials and services, consisting of administrative contracting officer delegated and assigned authority and government representation with the assigned contractor for the Departments of the Navy, Air Force, Army, and Defense; other government agencies and foreign governments." [Ref. 29: p. 1]

1. Functions of the NAVPRO

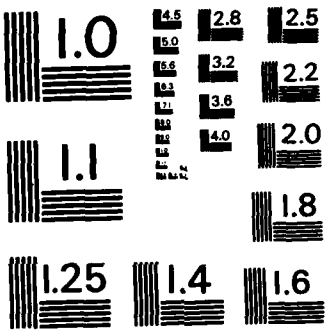
The functions of the NAVPRO, Minneapolis, are:

a) "Performance of Contract Administration for DOD and, as assigned, other Government contracts in accordance with the Federal Acquisition Regulation Subchapter G and the DOD Federal Acquisition Regulation Subchapter G. Tasks include in part:

   1. Performance of engineering surveillance and technical liaison with the contracting activities to ensure that all engineering reliability and maintainability, configuration management requirements of assigned contracts

AD-A159 589 SELECTION OF ORGANIZATION STRUCTURES WITHIN THE NAVAL FACILITIES ENGINEERING COMMAND(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA C F VAUGHAN JUN 85 2/2

UNCLASSIFIED F/G 5/1 NL



are performed in accordance with requirements of the contracts and associated specifications.

2. Performance of production support, surveillance and status reporting; property administration; contract financial management; industrial readiness planning; plant clearance; and traffic management as specified in the contract or other applicable directives.

3. Performance of the quality assurance functions necessary to assure that material and services being acquired by the government should conform to contractual requirements prior to their acceptance.

4. Review and evaluation for technical adequacy the logistics support, maintenance, and modification program accomplished by the contractor.

5. Furnish physical security support to contractor for the Naval Industrial Reserve Ordnance Plant. Administer physical and information security programs within the NAVPRO.

b) Perform technical representative functions in support of NAVSEASYSCOM and project managers. Tasks may include in part:

c) Exercise of final technical authority, including decisions affecting design, reliability and tradeoffs in design because of cost, performance, or schedule considerations.

d) Approval of specifications and modifications to test plan.

e) Technical guidance in source selection of subcontractors.

f) Technical approval of changes involving design, costs and schedule impact requiring issuance of change orders or supplemental agreements.

g) Technical assistance in developing provisioning list, support equipment and related documentation.

h) Represent the Naval Sea Systems Command as the Naval Industrial Reserve Ordnance Plant on site manager.

i) Provide command, administrative and technical support to the Naval Training Unit.

j) As the AEGIS Area Commander, responsible for all AEGIS activities in the Twin Cities. Monitor activities of three contractors and keep AEGIS project manager informed on AEGIS related matters." [Ref. 29: pp. 3-4]

2. A NAVPRO Organization Structure

The NAVPRO Minneapolis office is shown in Figure E.1.

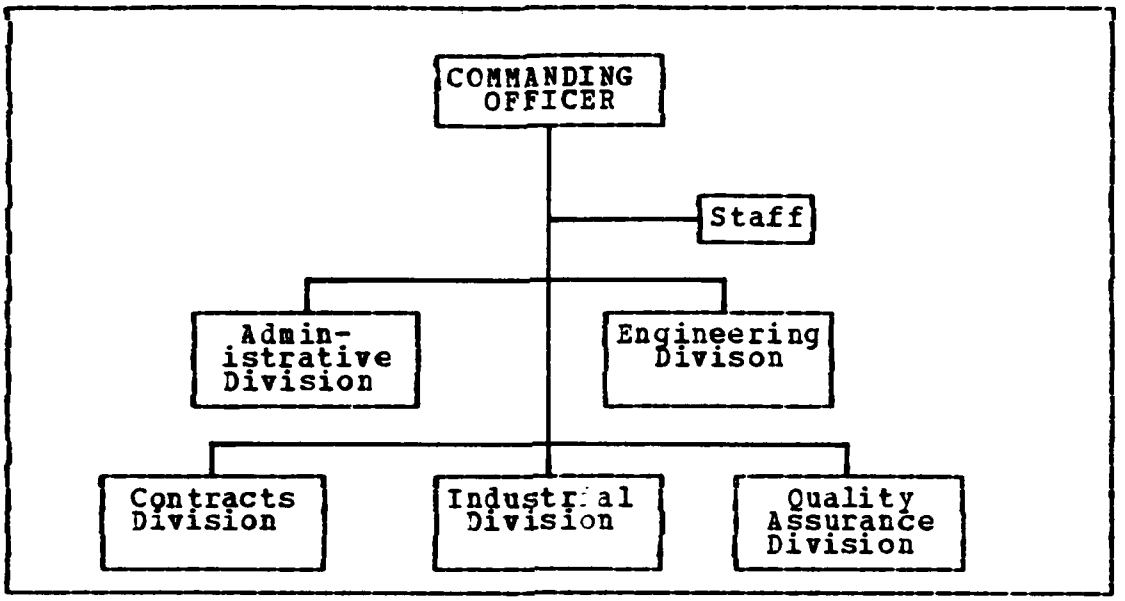


Figure E.1 A NAVPRO Organization.

C. A DEFENSE CONTRACT ADMINISTRATION SERVICES PLANT REPRESENTATIVE OFFICE

1. Functions of the DCASPRO

The principal functions of a DCASPRO or DCASMA are listed in subsection 42.302 of the Federal Acquisition Regulations (FAR). Sixty-one functions are listed in the FAR; the basic areas of activity are:

1. contract administration (price/cost analysis, modifications, etc.);
2. quality assurance (inspection, acceptance);
3. production surveillance and preaward survey ; and

4. engineering support. [Ref. 27: p. 5]

A DCASPRO is a contract administration office (CAO) as defined by FAR subpart 42.201.

"Assignment of a contract to a CAO for administration automatically carries with it the authority to perform all of the normal functions listed in (FAR subpart) 42.302(a) to the extent that those functions apply to the contract." [Ref. 30: subpart 42.202]

2. A DCASPRO Organization Structure

The DCASPRO at Hughes Fullerton is shown in Figure E.2.

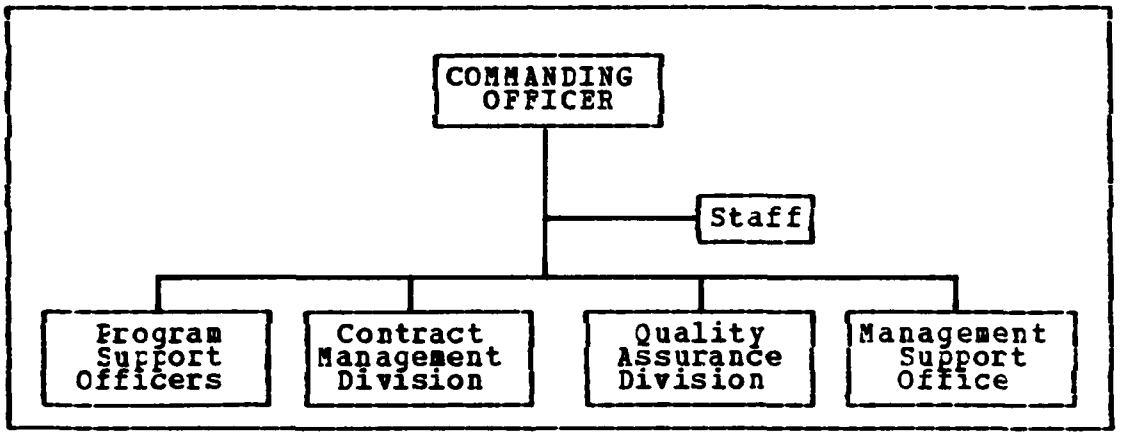


Figure E.2 A DCASPRO Organization.

APPENDIX F

ORGANIZATION SELECTION WORKSHEET

The purpose of this worksheet is to provide a quantitative methodology for evaluating multiple organization structures. Results of the methodology will provide NAVFAC with a quantifiable basis upon which to select an EFD organization structure. Five EFD organization structures, shown as alternatives 1 through 5 (Figures F.1 through F.5), will be evaluated. For NAVFAC to quantify its decision it is essential that you follow the steps listed below.

There are no correct or incorrect answers to the questions that follow: the answers depend upon each individual's judgement. A sample completed worksheet has been included to assist you in preparing the worksheet. Your participation in completing this worksheet is appreciated.

Step 1. Twelve possible attributes, or qualitites, an organization might possess are listed below. From the list of attributes select a minimum of six that, in your opinion, should be a goal or objective of the EFD organization structure. Circle the attribute number for each attribute selected.

___ 1. A minimum level of conflict resolution;

___ 2. Efficient workflow;

___ 3. Efficient use of resources;

___ 4. The ability to cope with a changing and multifacitated environment;

___ 5. The ability to cope with task uncertainty;

___ 6. The independence of the contract administration function;

___ 7. Direct access of contracts personnel to the commanding officer;

___ 8. The equalizing of contracts personnel and technical personnel;

___ 9. Innovation of personnel;

___ 10. Goal congruence of personnel;

___ 11. The level of decentralization; and

___ 12. Promoting the professionalism of personnel.

Step 2. Rank the attributes selected in step one by indicating, in the blank provided above, the appropriate rank. Rank the attributes from 1 to 12 (or as appropriate), with 1 being the most important and 12 the least important attribute.

Step 3. Rate the attributes in importance by assigning a weight to each attribute. The weight scale that will be used is a scale of 10 to 100. Begin by

assigning a weight of 10 to the least important attribute (ranked number 12 in step two). (The weight of 10 serves as a base against which to compare the remaining selected attributes). Next assign weights (integers between 10 and 100) to the remaining attributes to indicate their importance in comparison with the base value of 10. For example, if the next attribute were equally important give it the same weight. If it were more important, but not necessary twice as important, it could be assigned a weight of 12, 14, 15, 18, etc.. List the weights assigned to the attributes in the table below.

RANK	ATTRIBUTE	WEIGHT
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Step 4. For each attribute selected, rate the five alternative structures in the table below. First cross out those attributes not selected in step 1. For each remaining attribute, rate, on a scale of 0 to 10, how well each alternative enhances or promotes that attribute. Hint: begin by selecting the alternative that best enhances or promotes an attribute and assign it a value of 10. Assign utility values to the remaining alternatives which indicate how well they enhance or promote an attribute, compared to the best alternative selected. For example, if ranking efficient workflow you felt that one alternative was only about one-half as efficient as another, assign it a value of 5 and assign a value of 10 to the alternative with the most efficient workflow.

Step 5. Return the completed worksheet to NAVFAC code ___.

ATTRIBUTE	ALT #1	ALT #2	ALT #3	ALT #4	ALT #5
Access to commander					
Conflict resolution					
Congruence					
Decentralization					
Envircnment					
Equal status					
Independence					
Innovation					
Professionalism					
Resource efficiency					
Task uncertainty					
Workflow efficiency					

Sample tables are shcwn below:

RANK	ATTRIBUTE	WEIGHT
1	DECENTRALIZATION	100
2	INDEPENDENCE	80
3	EQUAL STATUS	60
4	CONFLICT RESOLUTION	40
5	PROFESSIONALISM	40
6	RESOURCE EFFICIENCY	25
7	EFFICIENT WORKFLOW	20
8	ACCESS TO C.O.	15
9	TASK UNCERTAINTY	10
10	ENVIRONMENT	10
~~11~~		
~~12~~		

ATTRIBUTE	ALT #1	ALT #2	ALT #3	ALT #4	ALT #5
Access to commander	5	10	5	5	5
Conflict resolution	4	4	10	10	8
~~Congruence~~					
Decentralization	8	2	10	8	8
Envircnment	10	4	10	10	10
Equal status	10	5	10	10	10
Independence	5	5	5	10	5
~~Innovation~~					
Professionalism	5	10	5	5	5
Resource efficiency	5	10	10	10	10
Task uncertainty	8	5	10	10	10
Workflow efficiency	6	2	10	10	8

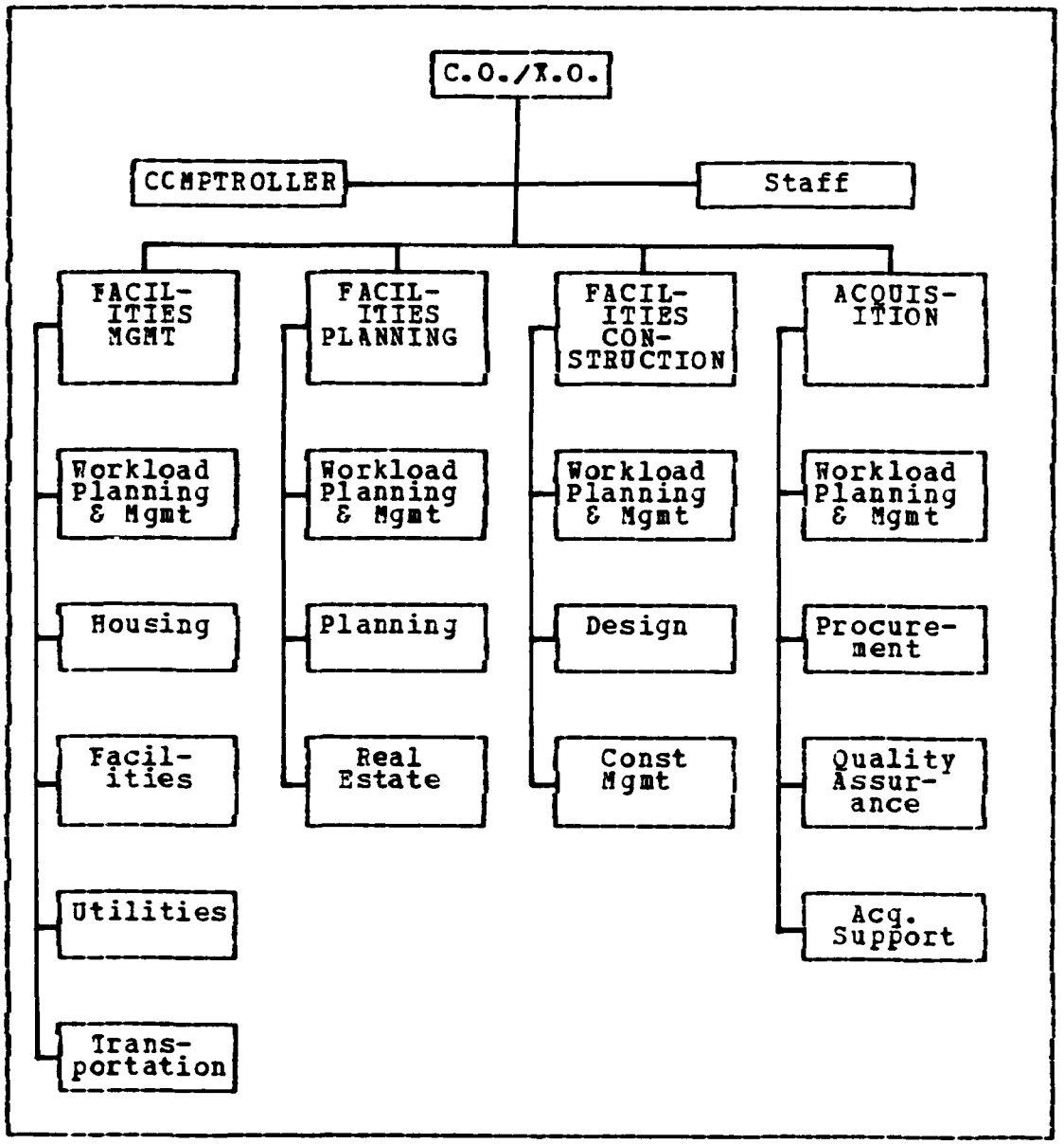


Figure F.1 EFD Organization, Alternative #1.

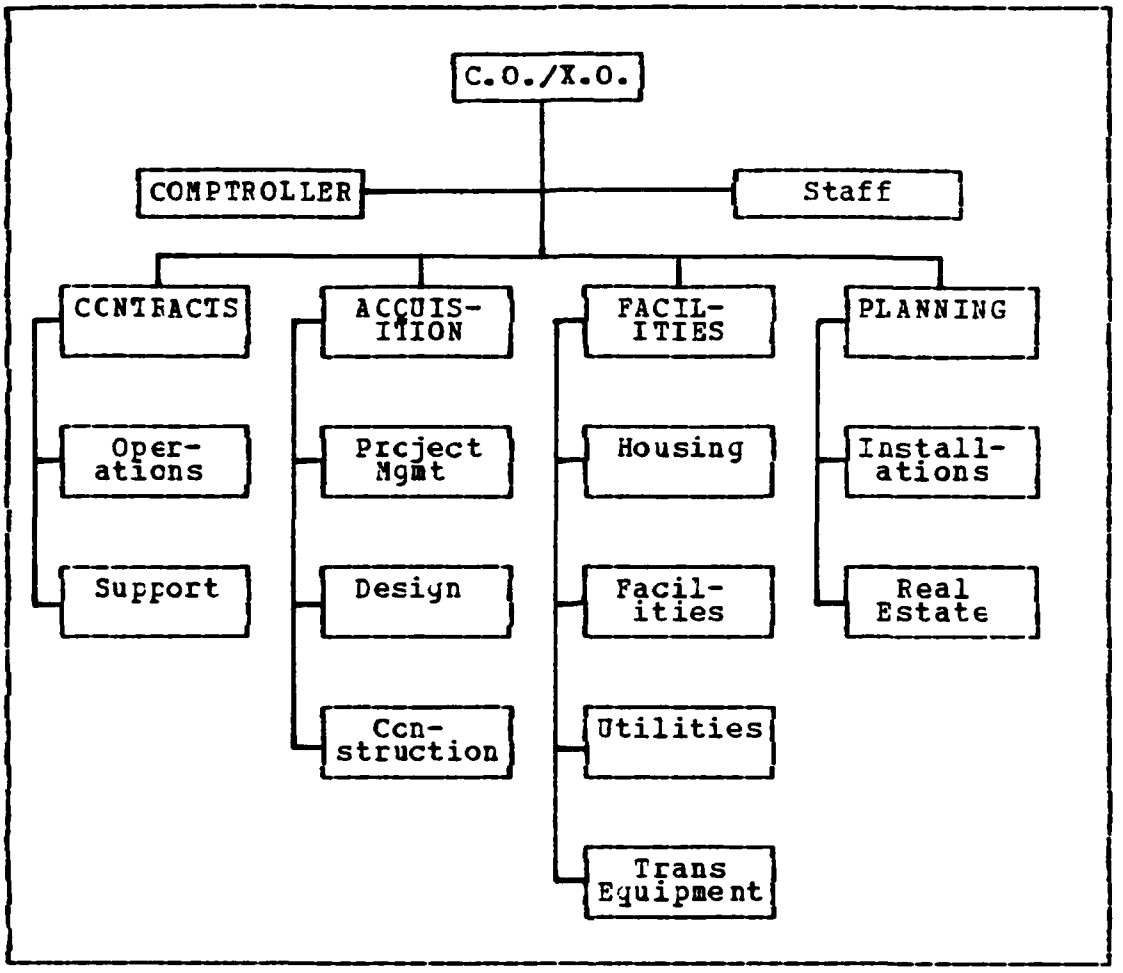


Figure F.2 EFD Organization, Alternative #2.

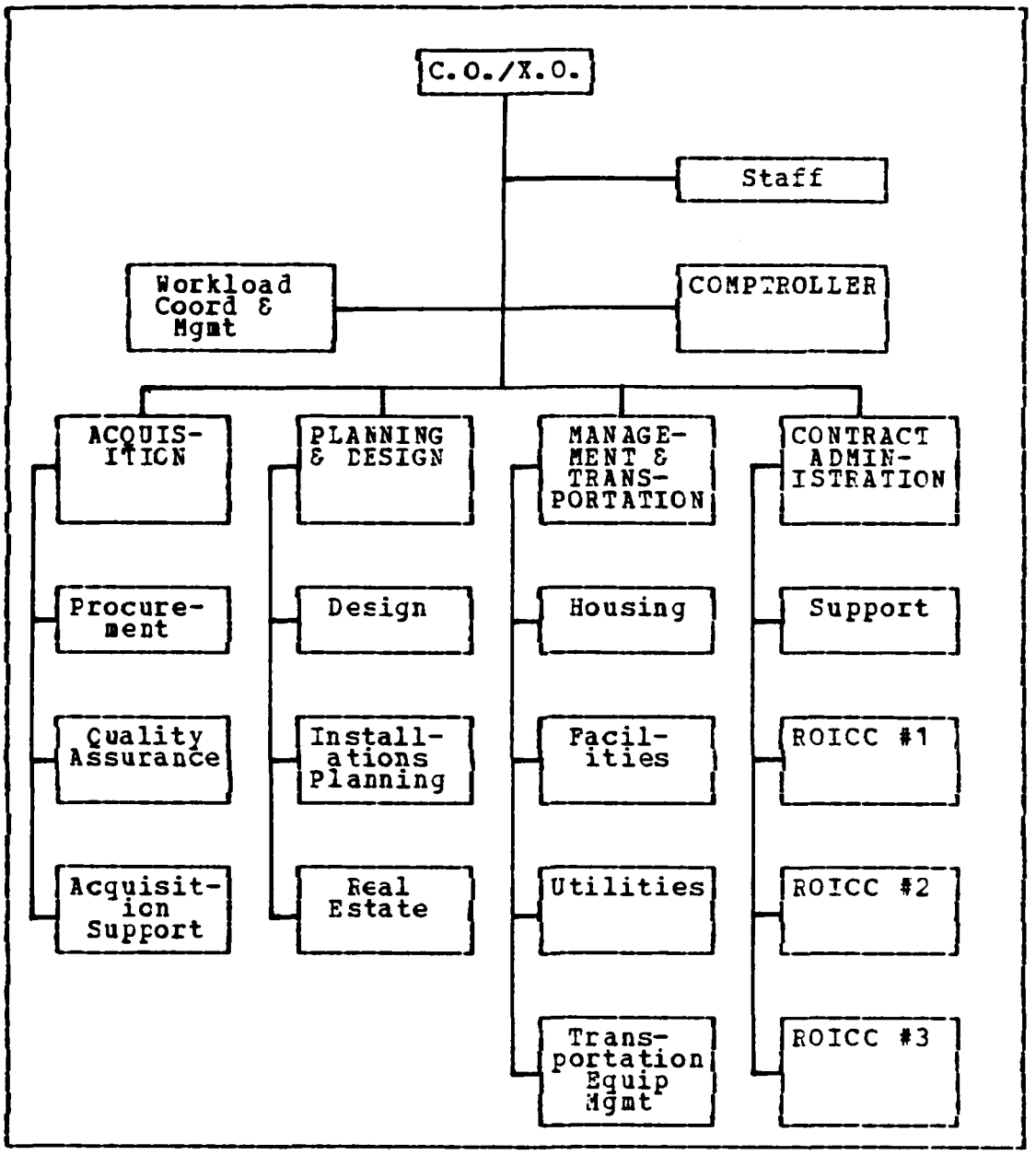


Figure F.3 EFD Organization, Alternative #3.

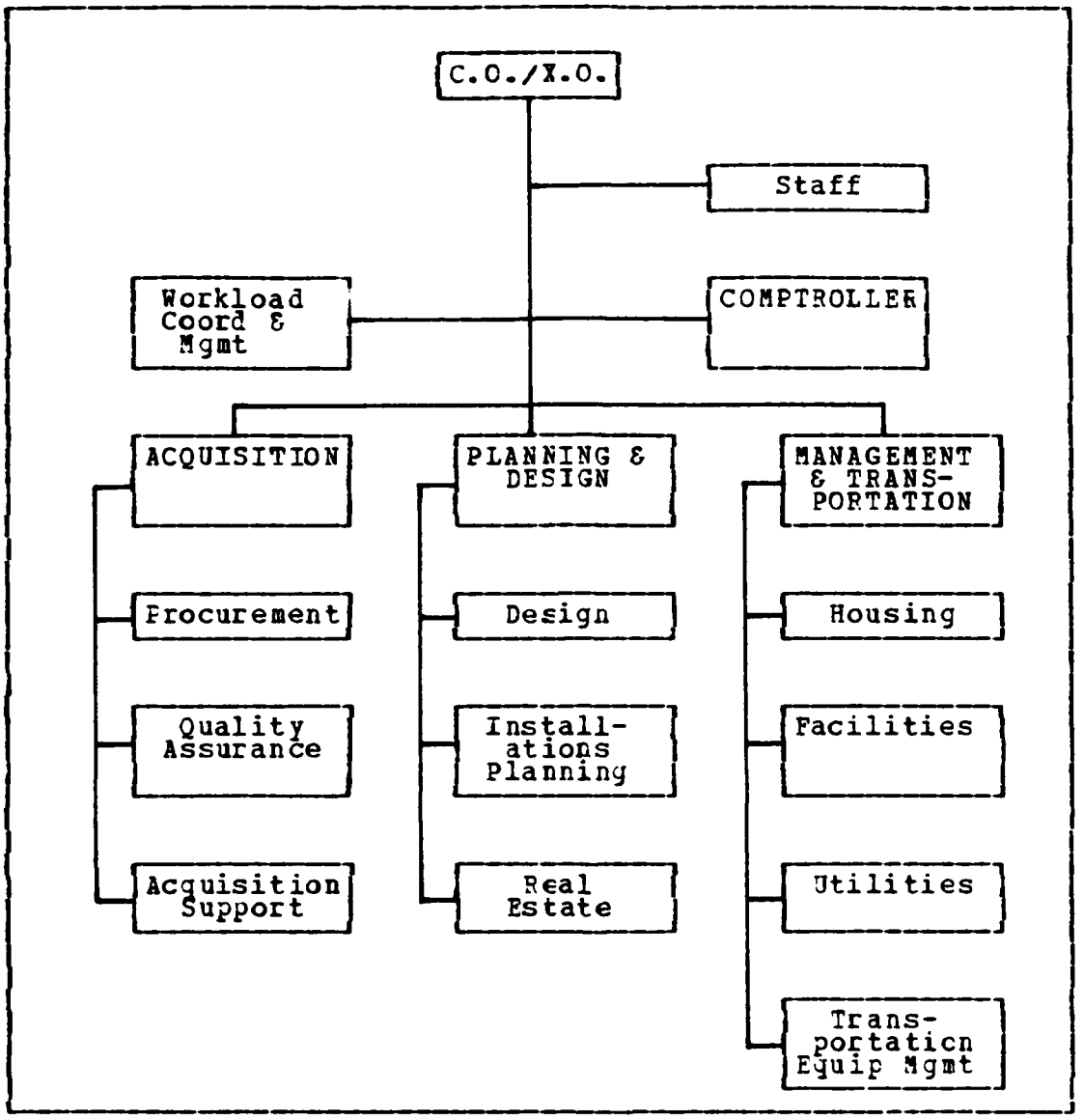


Figure F.4 EFD Organization, Alternative #4.

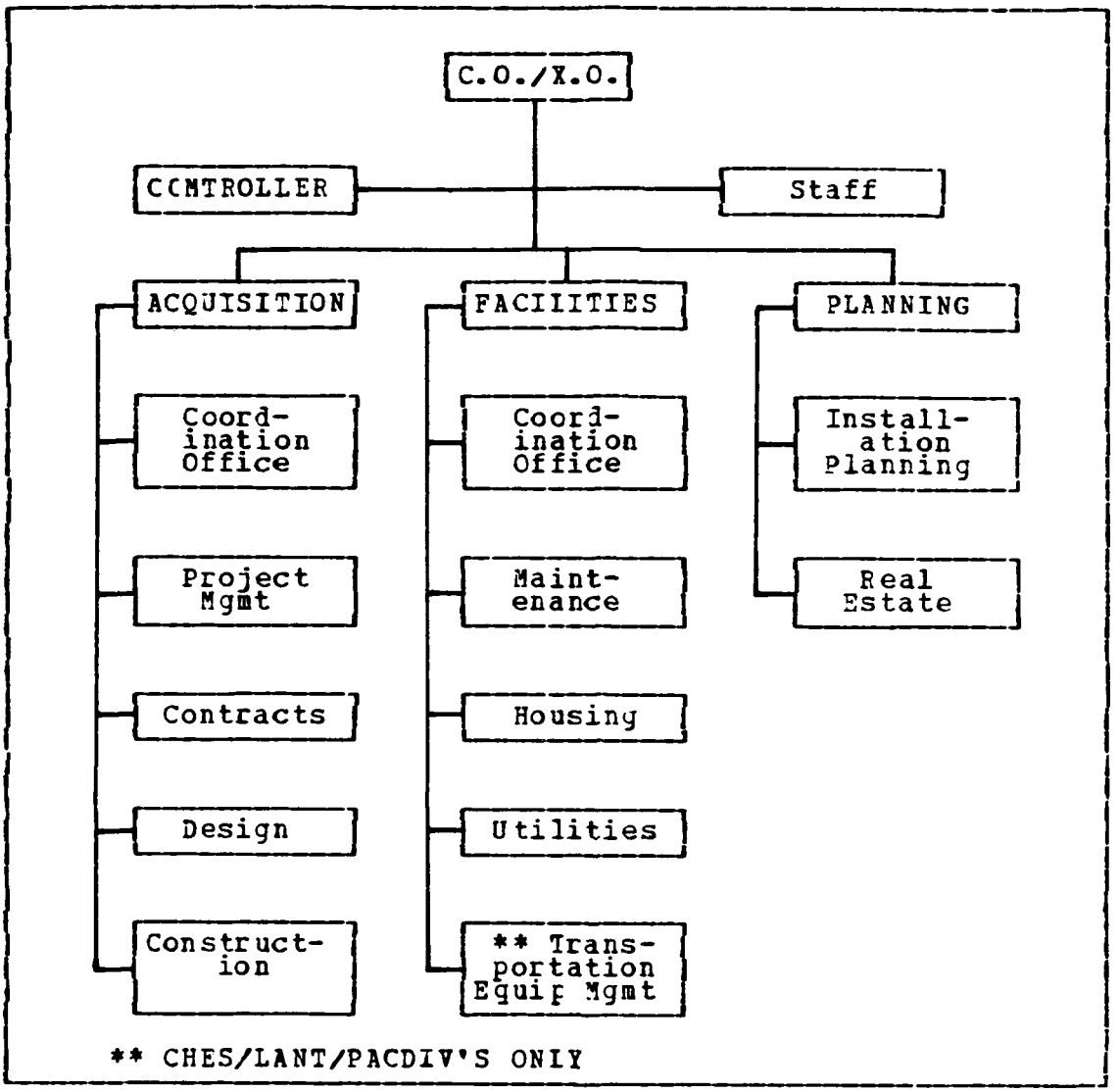


Figure F.5 EFD Organization, Alternative #5.

LIST OF REFERENCES

1. Drucker, P. F., The Practice of Management, Harper & Row, 1954.

2. Duncan, R., "What is the Right Organization Structure? Decision Tree Analysis Provides the Answer," Organizational Dynamics, pp. 59 - 79, Winter 1979.

3. Galbraith, J. R., Organization Design, Addison-Wesley Publishing Company, 1977.

4. Robey, D., Defining Organizations, Richard D. Irwin, Inc., 1982.

5. Ansoff, H. I., and Brandenburg, R. G., "A Language for Organization Design," Management Science v. 17, no. 12, pp. 705 - 731, August, 1971.

6. Quinn, R. E., Ad Hoc Study of Command Contracting Organization, Naval Facilities Engineering Command, Washington, D. C., 7 January 1985.

7. Einhorn, H. J., and McCoach, W., A Simple Multiattribute Utility Procedure for Evaluation, paper presented at Multiple Criteria Problem Solving Conference, Buffalo, N.Y., August 22-26, 1977.

8. Report of the CNM Procurement Management Review Division of September 1984, Chief of Naval Material, 4200 024 of 07 Sep 1984.

9. NAVFACINST 5450.73C, Mission, Organization and Functions of the Naval Facilities Engineering Command Engineering Field Divisions, Naval Facilities Engineering Command, Washington, D.C., 26 Oct 1982.

10. Mansfield, E., Micro Economics, Theory and Applications, 4th edition, Norton and Company, 1982.

11. Naval Postgraduate School Report NPS55Gi76031, A Multiattribute Approach to Measure Quality of Health Care, by W. C. Glauque, March 1976.

12. Gardiner, P. C., and Edwards, W., Public Values: Multiattribute Utility Measurement for Social Decision Making, in Human Judgement and Decision Processes, Kaplan, M.F., and Schwartz, S., ed. Academic Press, 1975.

13. Naval Facilities Engineering Command, Contracting Manual (NAVFAC P-68), Navy Publications and Printing Office, Philadelphia, PA., 1983.

14. NAVMAT Instruction 5460.2B Naval Material Command Organization Manual, Naval Material Command, Washington, D.C., 24 May 1983.

15. Naval Facilities Engineering Command, Command Management Plan (NAVFAC P-441), Navy Publications and Printing Office, Philadelphia, PA., Aug 1983.

16. Ham, W. L., Selection of an Optimum Air Defense Weapon Package using MAUM, Thesis, Naval Postgraduate School, Monterey, California, June 1983.

17. Edwards, W., "How to Use Multiattribute Utility Measurement for Social Decisionmaking", IEEE Transactions on Systems, Man, and Cybernetics, 1977.

18. Meyers, C. E., Elementary Business and Economic Statistics, Wadsworth Publishing Company, Inc., 1966.

19. Christensen, C. R., and others, Business Policy, Text and Cases, 5th edition, Richard D. Irwin, 1982.

20. Anthony, R., Dearden, J., and Bedford, N., Management Control Systems, 5th edition, Richard D. Irwin, 1984.

21. Kilman, R., Pondy, L., and Slevin, D., The Management of Organization Design, North-Holland, 1976.

22. Naval School, Civil Engineer Corps Officers, Student Guide for Construction Contract Administration and Management, CIN: A-4A-0032, November 1983.

23. "Office of Federal Procurement Policy Act Amendments", Congressional Record, v. 129, no. 75, 6 June 1983.

24. Koontz, H., O'Donnel, C., and Weihrich, H., Management, 7th edition, McGraw-Hill, 1980.

25. Naval Air Systems Command Headquarters Organization Manual NAVAIRINST 5400.1B, Naval Air Systems Command, Washington, D.C., 24 May 1974.

26. Naval Air Systems Command Instruction 5400.1B, Naval Air Systems Command, Washington, D.C., 24 May 1979.

27. Booz, Allen and Hamilton Report, Analysis of Alternative Structures for Contract Administration in the Department of Defense, Booz, Allen and Hamilton, 17 November, 1978.

28. The Naval Supply Systems Command, Introduction to Supply, NAVSUP Publication 1, Navy Department, 7 July 1981.

29. Navy Plant Representative Office Minneapolis Instruction 5450.1A, Navy Plant Representative Office Minneapolis, Minneapolis, Minnesota, 23 August 1984.

30. Department of Defense, General Services Administration, and the National Aeronautics and Space Administration, Federal Acquisition Regulations, v. 1, parts 1-51, 1 April 1984.

BIBLIOGRAPHY

Blanchard, B. S., Engineering Organization and Management, Prentice-Hall Inc., 1976

Commander, Naval Facilities Engineering Command, Headquarters Organization Manual, (NAVFAC P-313), Department of the Navy, Naval Facilities Engineering Command, Alexandria, VA., March 1984.

Kaplan, M., and Schwartz, S., Human Judgement and Decision Processes, Academic Press, 1975.

Nash, J. D., A Comparative Study of Acquisition Departments in Two Engineering Field Divisions of the Naval Facilities Engineering Command, Master's Thesis, Naval Postgraduate School, Monterey, California, March 1977.

Naval Facilities Engineering Command unclassified letter to Chief of Naval Material, Subject: Procurement Management Review of the Naval Facilities Engineering Command, 12 October 1984.

The U.S. General Acccunting Office, Report NSIAD-85-16, The Navy Needs to Strengthen Facilities Construction and Maintenance Contracting Practices and Management Controls, Report to the Secretary of Defense, January 30, 1985.

END

FILMED

11-85

DTIC